MARCH, 1951

Food Industries

For those who control quality and costs through management and production—a McGraw-Hill publication

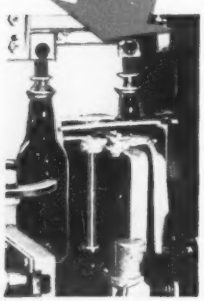
Jars of salad dressing come six-at-a-time from filler in Kroger's Cincinnati plant that turns out 20,000 gal. weekly.

PREVENTIVE QUALITY CONTROL, Phytates and enzymes, Enriching candy, New packaging technic, Model mill, Flowsheet, Materials handling report

We find our Bee-Line Labeling Machine does reliably efficient labeling, especially in the feeding, discharging and handling of our bottles. We like the way the machine holds them firmly all the way, always centering them properly for accurate locating at each station. We are very well pleased with its performance and output.

S. C. Torno
Vice President, Danforth Wines, Ltd.
Toronto, Ontario, Canada

WORLD BEE-LINE LABELER HOLDS CONTAINERS *firmly* FOR PRECISION LABEL-REGISTRATION



World engineers designed the "Walking Beam" just for the BEE-LINE. It's a one-piece, rigid unit with head-grips for each container and a serrated bar contacting its base. "Walking Beam" picks up containers directly from the conveyor at the feed end — holds them securely as they feed down the "bee line" — then deposits them safely onto the discharge chain without any other mechanical means. Thus each container is accurately positioned for placement — for precision label registration — for characteristically smooth, clean application of body, front, front and back, and neck labels — on any size, any shape glass container — at the rate of 2 or more per second.

"YOU GET THE BEST LABELERS IN THE WORLD"

ECONOMIC MACHINERY COMPANY
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DIVISION OF GEO. J. MEYER MANUFACTURING CO.
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Food Industries

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ALLIS-CHALMERS BASIC INDUSTRIES RESEARCH LABORATORY

Batch processing laboratory contains facilities for small scale tests.

New 32-page Booklet Describes Research Facilities Available for Process Testing—Including Food, Grain and Chemical Testing!

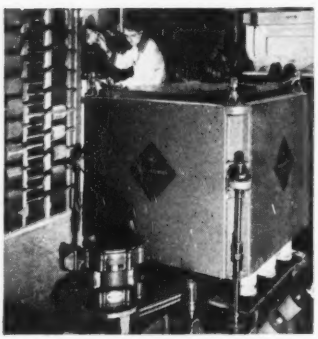
WANT TO KNOW COSTS of a process *before* full-scale production? Need laboratory engineering information that will guide you in designing a *more efficient* plant?

To help answer vital questions such as these, a new booklet — the picture story of the Basic Industries Research Laboratory — defines the types of research available, contains a record of investigations plus an important section about costs and a complete description of the testing equipment available.

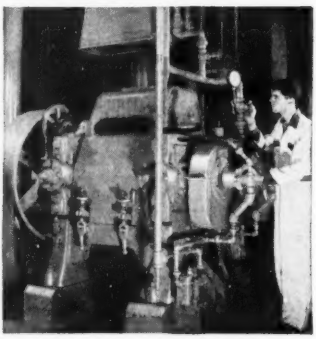
Typical pictures shown here are of testing facilities for food, chemical and grain processing operations.

Some 90% of the test work conducted in this section of the Laboratory covers such products as nut shells, scrap leather, sisal fiber, dehydrated soaps, malted milk, sugar, salt, coffee, beans, seed, coal and other materials. Here, profitable solutions to problems of scrap and waste utilization are being discovered and made available.

If you are engaged in or associated with the basic industries processes, we would be most happy to send you a copy of this valuable booklet. Write your nearest Allis-Chalmers district office.



Commercial size gyratory sifter for special tests. Note also experimental corrugated and smooth rolls for batch roller mill tests.



Rolls on this full size flaking mill may be steam heated or refrigerated to meet requirements of various flaking tests.

New 32-page booklet pictures extensive testing facilities available — facilities which may help solve your processing problems!

Allis-Chalmers
Milwaukee 1, Wis.

Please send new Laboratory Bulletin 0786419B.

Name.....

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Position.....

Address.....

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ALLIS-CHALMERS

Basic Industries Research Laboratory — Dedicated to a Better Utilization of our Raw Materials

HIGHLIGHTS

Marketability of maraschino-type cherries is greatly improved by pre-processing treatment with calcium phytate. Chemical removes iron from fruit and prevents darkening of bruised spots upon processing. (Pg 91)

Buttermilk ice cream, in which a major portion of milk-solids-not-fat comes from sweet-cream buttermilk, should prove good outlet for previously wasted product. (Pg 90)

By using fungal-enzyme supplements, bakers now can control enzyme activity and bread dough consistency. Result—better loaf volume and crumb characteristics. These supplements may be added as dry powder concentrate, tablets dissolved in water, or in starch mixture. (Pg 80)

New high-speed packaging method has been developed for powdered materials. Pockets are stamped, 24 at a time, in roll-fed foil. Product is deposited in pockets, then top sheet of foil is applied and heat sealed to form individual packets at rate of 675 a minute. (Pg 102)

Special continuous freezing towers are now being used to reduce the temperatures of 1-lb. packages of fish to 0 deg. F. in but 75 min.—the whole operation complete within 2 hr. after filleting. And there's no need to marshall an entire "charge," for units take trayloads "on the run" whenever they are ready. (Pg 96)

Edwin T. Gibson, executive vice-president of General Foods Corp., has been named Deputy Administrator of the Defense Production Administration. To be in charge of staff services, he will have a hand in coordinating the defense production activities of various agencies.

World food production continues to increase. For 1950-51, output of important items is placed 2 percent above a year ago and 4 percent over the 1935-39 average, USDA reports. However, per capita calorie supply still is below prewar.

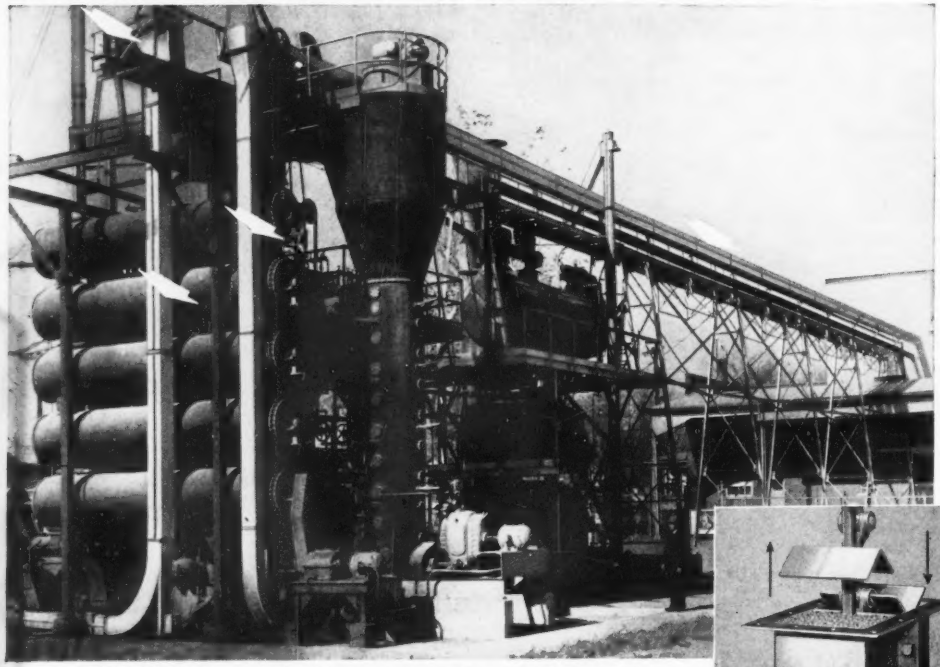
Operation Survival, American Can Co.'s project to free America from dependence on foreign sources of can-making materials, is making progress. Speed of turning out tinless cans has been increased, tin-free solders look very promising, and a plastic-cement solder substitute is under test. Fourth objective is to find organic plate coatings equal to those made from imported materials.

Delivery costs of frozen foods can be sharply reduced through use of a new lightweight, insulated, collapsible food shipper. It keeps foods frozen without dry ice or other refrigerants, or need for protection in refrigerated trucks. (New Equipment)

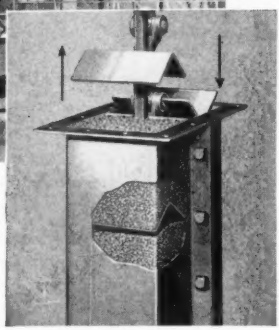
Railway cars can now be efficiently spotted or switched with the new versatile Track-mobile. Unit can operate either on track or ground and can change from one to another in 30 sec. (New Equipment)

Now comes the tractor that carries, as well as pulls, loads in inter-state runs. Particularly designed to double as a toter, it circumvents differences in legal trucking weights and lengths, thus eliminating extra freight handling. (Pg 125)

Here's why the Delphos mill chose LINK-BELT BULK-FLO Conveyors



Link-Belt Bulk-Flo Conveyors (indicated by arrows) at Delphos Grain & Soya Products Co., furnished to The V. D. Anderson Co., as part of contract for complete oil extraction unit.



Cutaway of Bulk-Flo vertical run shows material conveyed safely in series of compartments—carrying practically a 100% pay-load.

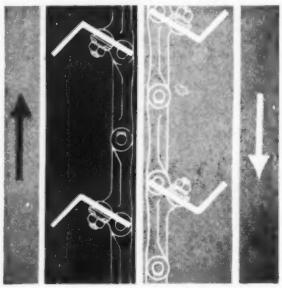
☛ *clean, dust-tight operation*
☛ *safe, gentle handling*
☛ *self-loading to capacity*

The Link-Belt Bulk-Flo Conveyor handles a wide variety of free-flowing materials, safely and economically, in a minimum of space. It is entirely self-loading to capacity... operates gently to reduce degradation of material and power consumption... is completely enclosed for dust-free performance. The versatile Link-Belt Bulk-Flo is self-discharging and largely self-clearing.

Whatever your materials handling problems, Link-Belt engineers will cooperate with your own engineers or consultants. For complete details, write direct or contact your nearest Link-Belt representative.

LINK-BELT COMPANY Chicago 8, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Johannesburg. Offices in Principal Cities.
12.197

SEND FOR THIS BOOK
Booklet No. 2175 will help you solve a wide range of material handling problems.



Travel may be horizontal, vertical, inclined, or combination in compact, self-contained unit. Multiple feed and discharge points may be used along horizontal runs of conveyor.

LINK-BELT

BULK-FLO ELEVATOR • CONVEYOR • FEEDER

The Talk of the Industry

Engineering Takes Over

What is the greatest common denominator in the food processing field? It is engineering—*food engineering*—the food processing counterpart of chemical engineering.

Every modern plant, every advanced process, every outstanding piece of equipment, and every new processed food product is a mirror of food engineering. Technical meetings in the industry tend more and more toward food engineering topics. Leading food processors have established engineering departments. And a prominent processor is filling foremen's jobs with young engineers.

Even the food plant chemist's work involves food engineering.

You will see more and more evidence of the engineering upsurge in the food industry as the months and years go by.

Bigness is Badge of Service

Perhaps the need to rely on big companies to get the defense mobilization job done will temper government attacks on bigness. But we suspect that there always will be those in high positions who will try to make political capital out of the alleged evils of large enterprises. So executives of large and growing food firms ought to read the article, "Swift & Company is Big Business," in the Swift 1950 annual report.

Two basic points are made by the article. First: The company has grown because it performs a needed economic service to the community. Second: The company could not adopt a policy of not growing without losing its vitality—the very spark of its existence and progress.

Know-How Is Not Enough

Heinz ketchup is a standard of quality. So another ketchup manufacturer hired a Heinz expert to show him how it's done. In about a year, the expert asked his former employer to take him back. And when H. J. Heinz II asked him why his change of heart, he said that the other company couldn't make a quality product.

"But you told them how, didn't you?"

"Yes, but they just wouldn't take the trouble to make good ketchup."

It is a lot of trouble to do everything just right. But it pays.

Progress on the Horizon

Two innovations which may spell higher quality and lower costs for cake bakers were cited recently by Tyler R. Stevens, American Machine & Foundry Co., in a talk before the New York Metropolitan Bakery Production Club.

One is a mixing technic for combining shortening with flour, eggs, and other ingredients, after the shortening is superchilled in a Votator but is still in the fluid state that precedes full crystallization (U. S. Patent 2,499,586). In this stage, the shortening can be more homogeneously blended with other ingredients to make a premix. This technic also may enable either shortening or mix manufacturers to prepare complete premixes for bulk shipment to bakers.

The second development is a new 30-sec. continuous preblender having two cone-shaped blades which revolve at 400 rpm. in a 20-qt. bowl. This preblender will continuously feed 4,000 lb. of cake batter per hour into a continuous Oakes mixer. And it can eliminate preweighing and batching operations if a dry mix and water are fed into the preblender by automatic proportioners. The 1.05 specific gravity of the premix can be easily adjusted to any desired figure at the Oakes mixer.

Efficient mixing means a saving of some expensive ingredients, as well as reduced operating costs.

Popcorn Packing Exploded

Popcorn cannot be used as a substitute for excelsior or shredded paper in packing things for shipment, says the Food & Drug Administration. Why? Because it is a food and therefore cannot be mistreated so that it becomes unfit to eat.

If the detonated kernels were used as packing, the carton would have to carry a food label, then the shipper would be charged with slack fill. Cute, eh?

Beer Now Very Much at Home

In the year following Repeal, 20 percent of the beer was packaged. Now 70 percent is sold in cans and bottles. And the figure is expected to rise another 10 percent in the next decade.

Seems that beer is becoming solidly entrenched as a package food product bought in neighborhood stores and consumed in the home.

Prohibitionists please note!

Hors d'Oeuvres

■ Mediterranean olive oil experts have agreed to distinguish between virgin and pure olive oil. It's the former when pressed from one olive crop, and pure when it's a "mixture of various olives and other lower grade oils, refined and confectioned into a pale gold odorless liquid." Looks like easy virtue on the Mediterranean isn't easy to achieve.

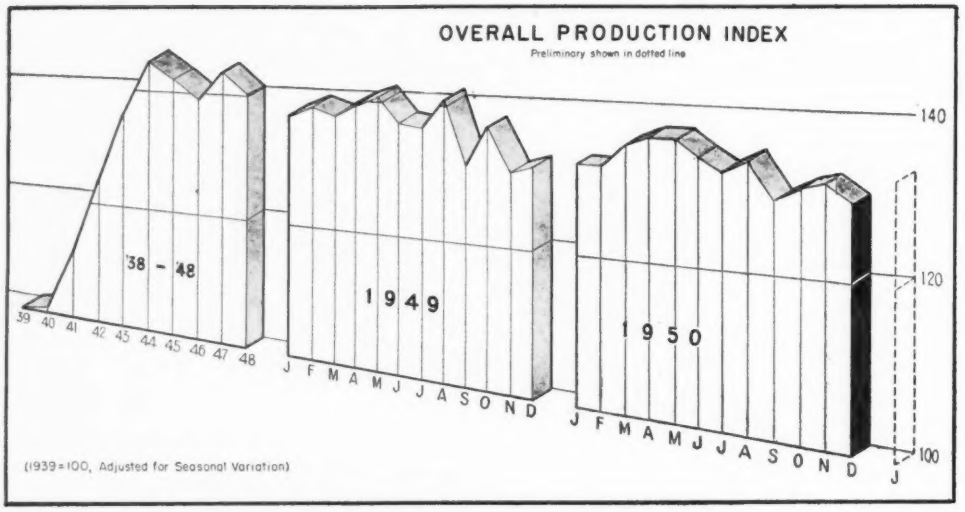
■ Dutch first brought tea to Europe in 1610, General Foods tells us. Coffee didn't come along until 1615, when the Italians introduced it. With such a head start it's no wonder tea rates so high in Europe.

■ That Troy, N. Y., manufacturer who pays off his help in the dollar equivalent of a specified number of 1-lb. loaves of bread, might have found an easy way to tie in wages and the cost of living, but he raises hob with the politicians who take all the credit for holding down the cost of bread.

■ Texans are swapping citrus fruits for Swedish "pre-cut" houses. Only need one tool to erect the houses, which is probably a lot less than the Swedes will need to get at the citrus.

■ Writer in *Esquire* says smoked meats are "fit for Heaven." Trouble is an imaginative salesman could say the same thing about potassium cyanide. **J.A.J.J.**

FI Index and Outlook


OVERALL PRODUCTION INDEX
Preliminary shown in dotted line
140
120
100
'38 - '48
39 40 41 42 43 44 45 46 47 48
1949
J F M A M J J A S O N D
1950
J F M A M J J A S O N D J
(1939=100, Adjusted for Seasonal Variation)

Weather, Strikes and Controls Hamper Food Distribution

FEBRUARY was a freakish month for the food industries:

Storms damaged a big share of the fruit crops that should have been in the 1951 pack.

Strikes disrupted normal shipping and warehousing arrangements.

Controls temporarily stopped trading in a number of food products and caused general confusion in the wholesale markets.

Production slowed down at many plants in February, although in January it was up to 134 on the FI index, from December's 131.

Stormy Weather

Preliminary reports indicate that sub-freezing cold caused significant damage to the peach crop. Winter wheat was hurt, too. And the Texas citrus crop—the half still to be harvested—took a real beating. On February 1, the Department of Agriculture was counting on 3,000,000-fewer boxes of citrus than on January 1. And later reports from Texas will probably reduce the figure still further.

Worst damage of all was to the Texas vegetable crop. Most of it will have to be replanted. Onions, lettuce, cabbage, beets and carrots all were ruined. Peas and tomatoes were badly hurt. The wholesale markets reacted immediately. Onions, for example, shot up 50c a sack. That's a 40 percent increase.

Florida crops got off more easily. They had some damage earlier this winter. But no real freeze damage occurred in January or February.

Best off, of course, was California—untouched by the storm belt. But plantings of some foods there are being reduced in favor of cotton, which claims a higher price.

Getting higher output per man-hour is going to be difficult. Studies made by the Bureau of Labor Statistics show that productivity suffers during an emergency period. It did during World War II. And it probably will again this time.

Food processing plants can list the following problems to watch for in the labor field:

1. Getting enough workers — particularly in the low-paid jobs. The problem of migrant workers at harvest time may be particularly acute.

2. Training inferior workers to do better. In 1951, it will be necessary to hire youngsters, oldsters, handicapped, and others not usually in the labor force. There won't be enough first class workers to go around.

3. Arranging work so that fewer people can do it. And this year—with equipment shortages—it won't always be possible to cut labor requirements by putting in a new machine.

4. Keeping up incentives. That's hard to do when wages are controlled and other jobs are easy to get.

Short Labor by Summer

The labor problem — worker shortages and lagging productivity—probably won't hamper food production seriously for the next few months. Defense plants still aren't luring many workers away. And it's an off season anyway in many lines of food processing. But this summer and fall, when processing activity hits a peak, the defense program will also be putting a severe squeeze on manpower. Then

At a Glance—

(1939 = 100, with all figures adjusted for seasonal variation.)

	Dec. 1950	Nov. 1950	Percent Change	Year Ago
Baking	124	125	−1	123
Butter	72	73	−1	87
Canning	161	161	0	144
Cheese	164	163	+1	180
Confectionery	122	126	−3	134
Evap. Milk	145	150	−3	140
Flour	119	102	+17	112
Ice Cream	176	195	−10	176
Malt Liquors	139	147	−5	150
Margarine	350	346	+1	284
Meat	145	146	−1	138
Sugar	112	96	+17	103

labor may become one of the limits on getting maximum food output.

Price ceilings threatened to stall production in a number of lines, as the first month of operation got underway. In meat packing, for example, the packers' selling prices were frozen. But no ceiling was placed on livestock prices. Meanwhile, all meat prices are frozen at the retail level. With consumer income rising, there will be excess demand and shortages.

The clear implication of all this is that black markets will develop. Every packer, large and small, will try to get and process all the livestock he can. And some will be improperly slaughtered, with resulting loss of byproduct production.

The price control authority has ruled that each packer must keep his livestock purchases in the same ratio to the overall industry as in 1950. But it will obviously prove very difficult to police the operations of the 18,000 small meat packers.

Although total meat production this year will be up about 5 percent, the big companies probably will not show so large a gain because of livestock losses to the small operators. That, in turn, means less byproduct activity, and a smaller rise in our FI index, which covers all phases of meat packing.

Profit margins will probably suffer, too. Competition for available livestock will bid up the price to the packers, who will be squeezed under prevailing ceilings.

Ceilings Cause Confusion

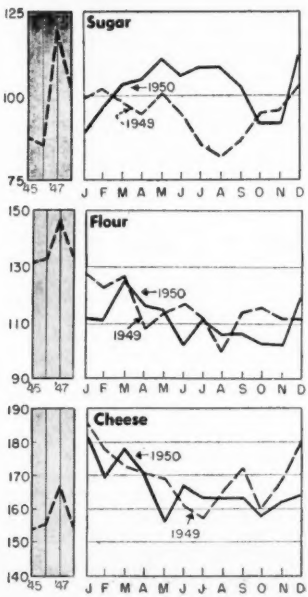
More confusion occurred last month in the canned food trade. Many wholesalers found themselves with ceilings lower than the prices they had agreed to pay on forward purchases. So these orders were cancelled. At the same time, the urge to build inventory has been lessened by the price fix.

It now looks as though canners' stocks will not be cleared out so quickly as indicated a month ago. In early January, some canning firms booked their entire first quarter's production. Now some of the bookings are cancelled, and the rate of new orders has slowed down.

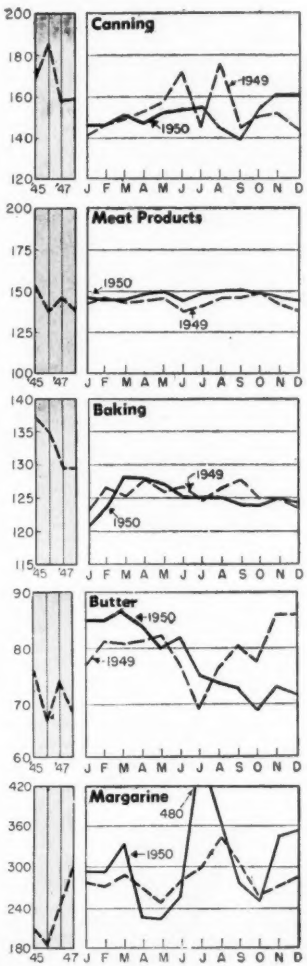
This doesn't mean supplies will flood the market. Wholesalers caught with low ceilings may hold their goods off the market until OPS readjusts the prices. And ceilings on canned goods make it tough for the processors to bid for fresh fruits and vegetables from the coming crop. There's no ceiling on most of the fresh produce. So farmers can count on rising prices in the fresh food markets. And it won't be easy to find land which can be devoted to crops for canning. The Department of Agriculture is encouraging heavier plantings of many other crops this year. So land is being switched into whatever is most profitable.

Some canners are making sure of their supplies by offering sky-high prices to the farmers. For example, California packers are contracting with growers for the fall tomato crop at $27.50 per ton. That's $5 per ton—or 22 percent—above the last 1950 price. The bidding may get even hotter. How long can this sort of thing go on without forcing the lid off the price charged by canners?

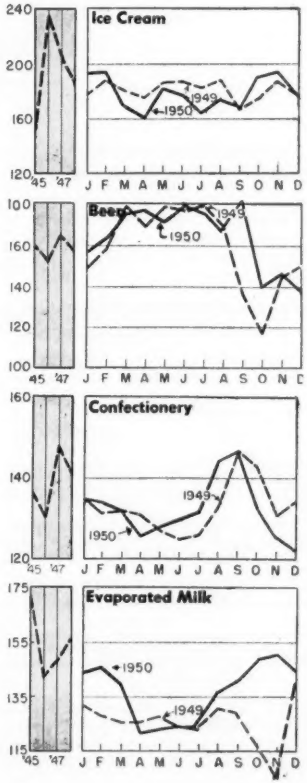
RISING ▲



STEADY ➔



FALLING ▼

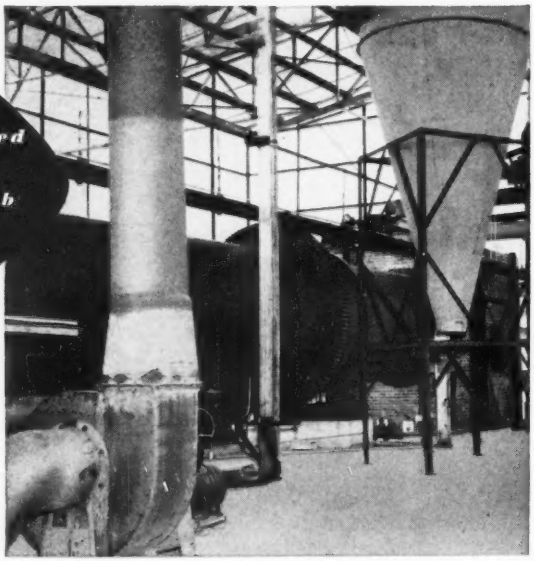


See Louisville for

CREATIVE DRYING ENGINEERING

How a new Louisville Dryer can lift production by 4½ times...profits by $11.54 per ton

Designed to do your job best!



FORMER DRYER

Installed cost	$9,000.00
Annual production (tons)	450
Drying cost per ton	$18.60
Capacity, lbs. dried product per hour	600

LOUISVILLE DRYER

Installed cost	$36,000.00
Annual production (tons)	2,025
Drying cost per ton	$7.06
Capacity, lbs. dried product per hour	3,500

EXTRA PROFIT PER TON DRIED WITH LOUISVILLE DRYER $11.54

Don't call in a "boy"—when the job is man-size! Small-production dryers *can* cost you big money—as the performance comparison figures shown here prove clearly. Here's black-and-white proof that it pays to have a Louisville engineer check over your dryer capacity.

A study of your problem may show that a larger-capacity Louisville dryer—especially designed for your purpose—will turn out 4½ times more production—with little if any increase in your labor costs. In fact, labor savings alone may spell the difference between a good profit or a sagging loss.

Find out what a specially designed Louisville dryer—with output pretested in our own unique laboratory and pilot plant—will do for you. Ask for a Louisville survey of your problem. There is no obligation.

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Louisville Drying Machinery Unit

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What Washington Thinks

ICE CREAM SCHEDULE—A new schedule has been set up by Food & Drug Administration for the hearing to establish a standard of identity for ice cream and related products. The original program broke down because it assumed that the hearing could be divided sharply into subdivisions according to the subject matter under discussion. It is now evident that when specialists come to present testimony, they must talk about a variety of subjects. Otherwise, many of these best informed individuals would have to run back and forth to attend these sessions piecemeal over a period of many months. As the discussions continue, it is anticipated that additional information will be presented in an effort to resolve the controversy as to what limits should be placed on the major components of ice cream, and how so simple a thing as "ice milk" can be defined. The proceedings will probably continue into June.

FAIR DEAL ENDED?—Emergency and defense projects obviously take precedence in official Washington planning. But the Fair Deal proposals are far from dead. The budget submitted by the President includes a very large number of items, of staggering total cost, which are essentially social reform. Congress is likely to be unsympathetic, but the efforts of the reformers will continue.

SCORCHED MILK—The quality of dried milks depends to a considerable extent on the number of scorched particles contained. To determine the quality of any sample, Production & Marketing Administration recommends a standard procedure calling for the use of "four disks, each bearing a specified amount of scorched particles to represent the amount that would be filtered from a stated quantity of reconstituted dry milk. The respective amount of scorched particles represented on the disks are 7.5 mg., 15.0 mg., 22.5 mg. and 32.5 mg." Those who seek highest market price must be prepared to measure and control the quality of their product in some such manner as this.

MORE MEAT PROMISED—American stockgrowers can increase the animal supply for the market beyond the maximum reached during World War II. This is a definite promise on behalf of stockmen made by Bureau of Animal Industry, which explains how production has now become more efficient through improved breeds, better feeding, and better control of pests and diseases. The BAI chief, B. T. Simms, gives the details in his annual report to Congress.

BUSINESS THINKING — Defense Production Administration, which is the top emergency agency, is being staffed with business executives to the maximum possible degree. But government career men are chafing under this program and sometimes upset the business thinking of the newcomers—even those highly placed. One should not expect a substitution of business philosophy for bureaucratic thinking in any complete way.

LEGAL MINIMUM—Farm prices are not controlled in the price stabilization as fully as are other goods. Instead, farmers are protected by minimum prices based on "parity" as newly calculated. It is too bad that the food processing business can't share in this political favor!

FROM WASTE TO BYPRODUCT—"Vegetable producers can convert leafy plant waste into a high-quality feedstuff with rotary dryers of the type commonly used for drying alfalfa." This is a conclusion of engineers at Eastern Regional Research Laboratory, where a careful experimental study has been made. Vegetable producers interested can get "Production of Leaf Meals from Vegetable Wastes in Rotary Alfalfa Dryers" (AIC-286) on application to Eastern Regional Research Laboratory, Philadelphia 18.

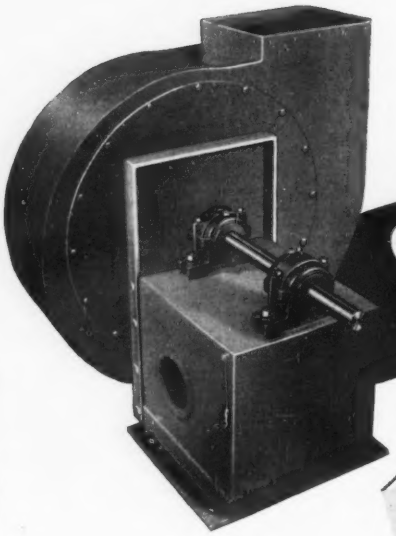
SOURCE OF WORKERS?—Civilian employees of the Federal government throughout the United States are numbered in the millions. Many of these are employed on projects that are not of a defense nature. It is suggested that food company recruiting might well survey these "swarms of federal job holders" to see whether some of these people might not be induced to take important work in food manufacture as a more urgent employment under present circumstances. When one learns that there are 179,000 of them in California, and nearly as many more in other big states like New York and Pennsylvania, it is evident that this source represents a potential of workers that cannot be wholly ignored as new personnel becomes scarce.

BACTERIA COUNT—The Production & Marketing Administration has surveyed and issued a summary on "Sanitary Milk and Ice Cream Legislation in U. S." This compares all of the published laws and ordinances on milk sanitation of the states and of 84 large cities. A further study is promised that will deal with the administration of these sanitary regulations and the effect on the actual bacterial count of milk delivered to the customer. (The first report can be had on request from PMA, U. S. Department of Agriculture, Washington 25, D. C.)

WAR INSURANCE—During World War II, Congress established the War Damage Corp., to write insurance against losses, during hostilities, of private property and the property of industry. The need for re-establishment of such an agency is being emphasized to Congress. Those interested in having that wartime supplement for normal insurance should urge their Congressmen to give attention to the matter soon.

ANTI-HOARDING—There is a very important list, on which new items are added frequently, indicating the scarce materials which must not be hoarded. In most instances the items are chemical materials, minerals, or such basic raw materials as have little or nothing to do with food manufacture. But it is expected that certain raw-material food items will be added occasionally. When that happens—as it surely will for such things as chocolate, pepper, and the like—there is one relief from restriction that food executives should know about. That is, the exemption from restriction of supplies that have been purchased abroad and imported by the holder. For example, cacao beans thus brought in by a chocolate company are not subject to hoarding regulations in the same way that they would be if the material had been bought in the U. S. from an importer. One can be reasonably sure that many big users of prospectively scarce raw materials are going to find it a definite advantage to buy abroad under these circumstances.

—R. S. McBride, Washington, D. C.



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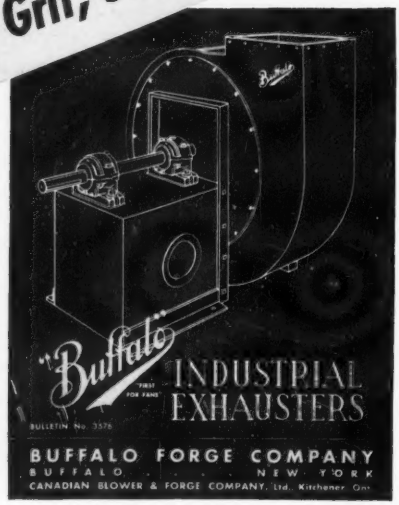

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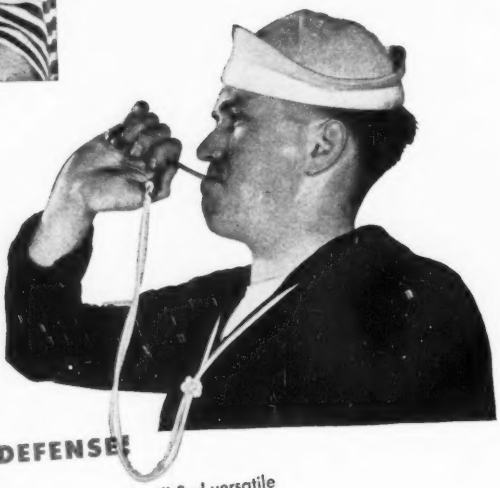

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*By Government authorities responsible for inventory control under the National Defense Act.

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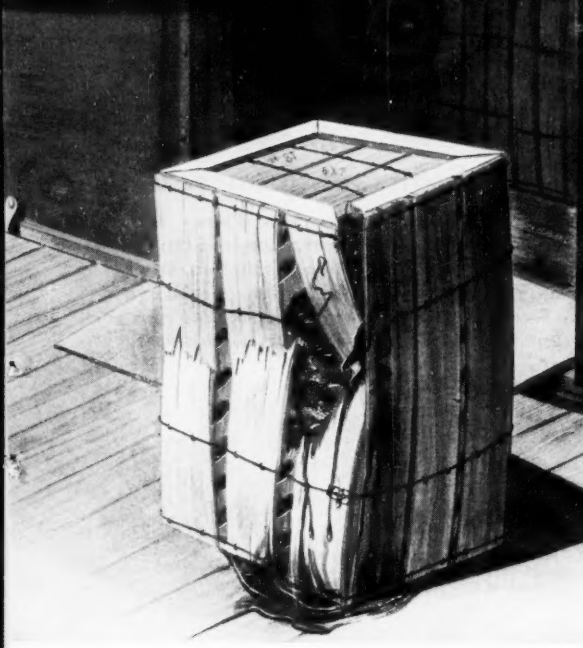

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- maintains a more uniform temperature; condensation and dehydration are reduced to a minimum. "Cold-Wall" construction and insulation plus a new mechanical refrigerating unit quickly convert UNICEL from a box to a refrigerator car. Heat can be provided during winter weather or in cold climates!
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- costs less to build, buy, operate, maintain.

It's another notable ***FIRST*** *for Pressed Steel Car Company*
FIRST *with the all steel hopper car in 1897*
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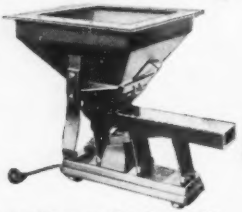
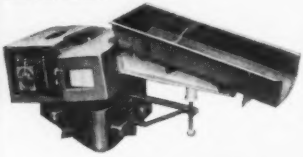
and all provide absolute control over tonnage handled in feeding and conveying operations



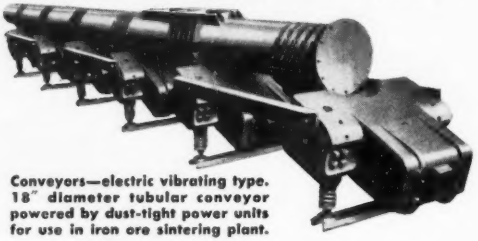
Small Reagent Feeders—with open or enclosed decks for capacities from 10 to 4000 lbs. per hour.

Spreading Feeders—for distributing materials evenly across wide surfaces.

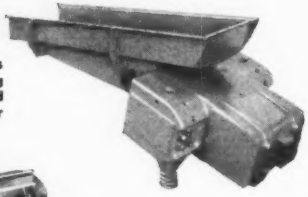
Built in a wide range of types and sizes, Jeffrey electric vibrating Feeders and Conveyors provide absolute control over tonnage handled. Open or enclosed pan, or tubular decks, for capacities ranging from a few pounds to fifteen hundred tons per hour. Investigate the accuracy of this equipment.



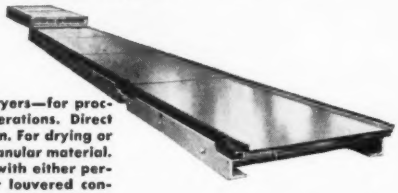
Spark-Proof Feeders (left)—for use in explosive atmospheres or where moisture conditions require special protection of coils.



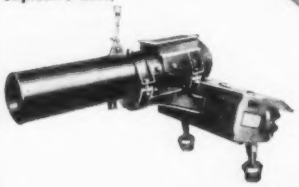
Conveyors—electric vibrating type. 18" diameter tubular conveyor powered by dust-tight power units for use in iron ore sintering plant.



Dust-Tight Feeders (right) — vibrating motor gaps protected from magnetic dust, or explosive dust.



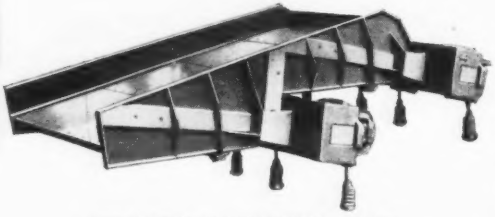
Coolers-Dryers—for processing operations. Direct type shown. For drying or cooling granular material. Equipped with either perforated or louvered conveying surface through which air or gasses are passed.



Water-Jacketed Feeders (left)—for feeding furnaces and driers, or handling hot material to coolers, etc.

Bin Level Indicator (above)—shows bin level at a glance to control feed to bin, maintain bin level or control discharging equipment.

Low Head type Barrel Packer (above)—a real economy in reducing size of containers, increasing capacity and cutting shipping costs. Can be supplied with deck to provide conveying action during packing operations.



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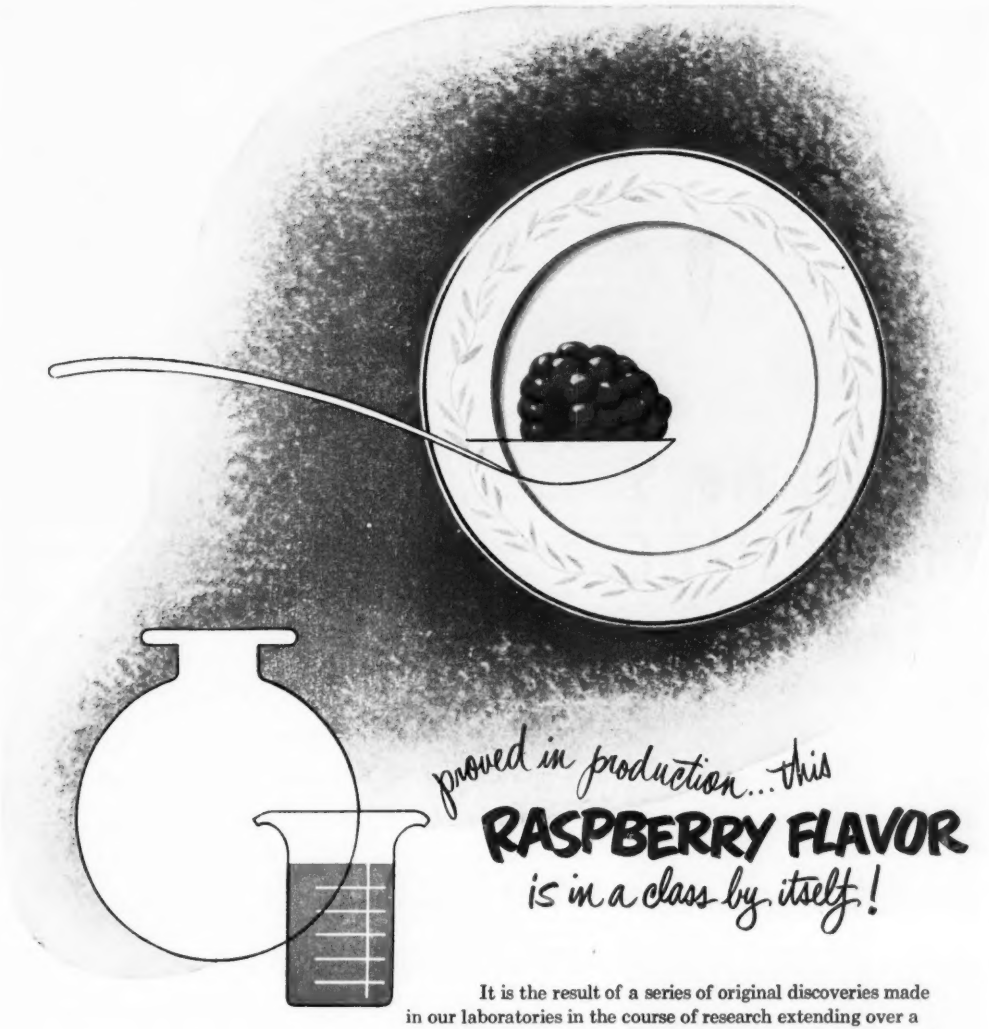

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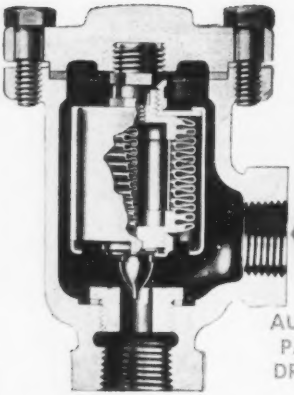

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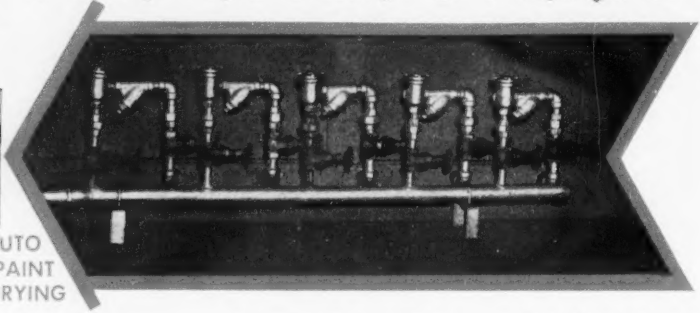

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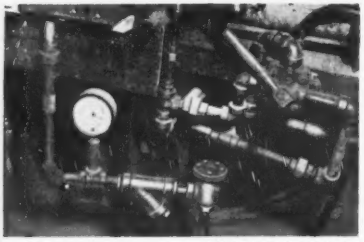
The hours of waiting in the morning for steam equipment to warm up can be reduced to minutes with the Sarco No. 9 thermostatic steam trap. It is wide open when cold. All air and condensate pass quickly. Then, during normal operation, condensate is discharged at a temperature within 10°F of that of the steam. This has given the trap double its former capacity. No seat changes are required for varying pressures within the range of each type from 0 to 300 p.s.i.



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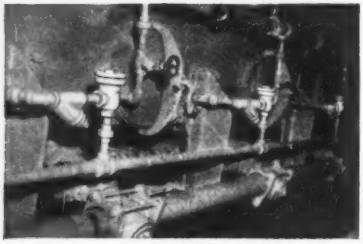

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This trap is so inexpensive that one can be placed on each coil or jacket and thus save enough in fuel and increased production to pay for the hook-up in a short time. The Sarco No. 9 is used extensively for process tanks, steam lines, radiators and wall coils, tracer lines and outdoor applications of all kinds. Ask for Catalog No. 250-A.

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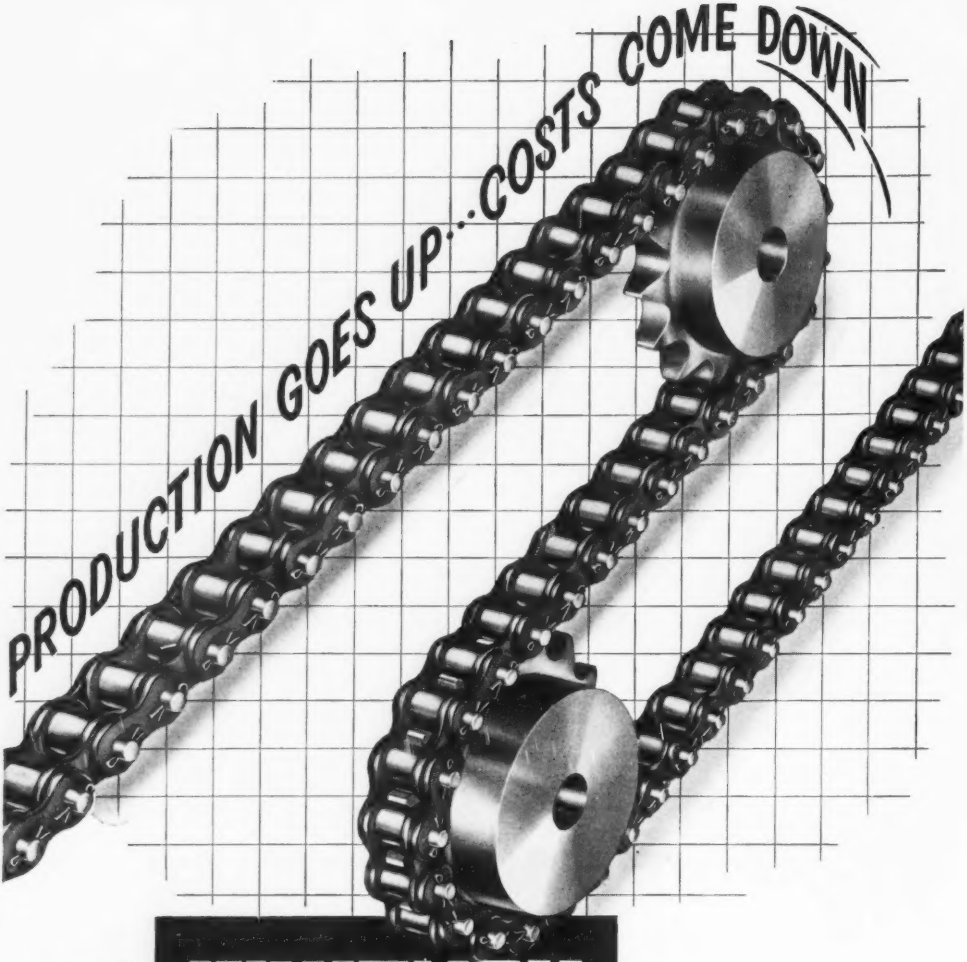

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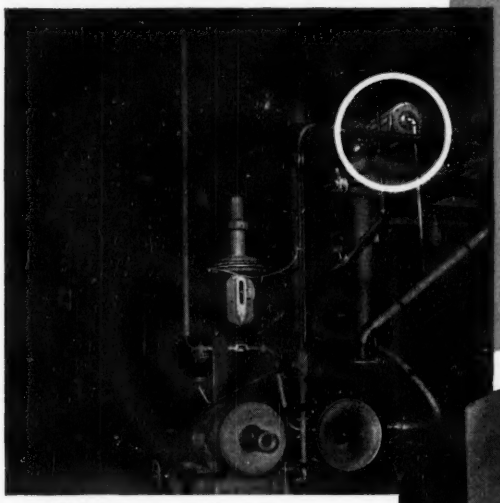
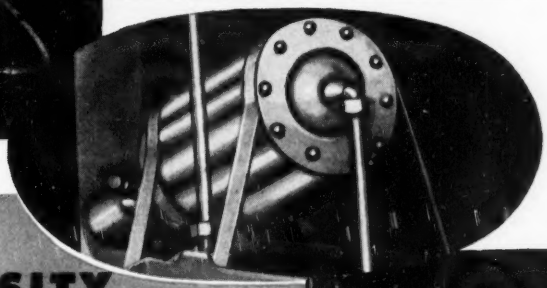
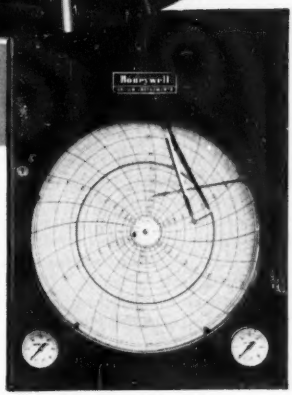


Installation photo courtesy of Pasco Packing Company, Dade City, Fla.



. . . with the BROWN DENSITY CONTROL SYSTEM



Designed for accurate regulation of critical densities in most food concentrators, this new system has already set new high standards of performance in the citrus juice industry. Consistent maintenance of density within .2° Brix is not uncommon.

Here is the answer to an urgent need for continuous and accurate measurement and control of food densities to keep in step with the tremendous growth of vacuum concentration. Low in cost, simple to operate, this system has no delicate parts to come in contact with the measured material. It is capable of handling a wide variety of products . . . even solutions containing suspended particles.

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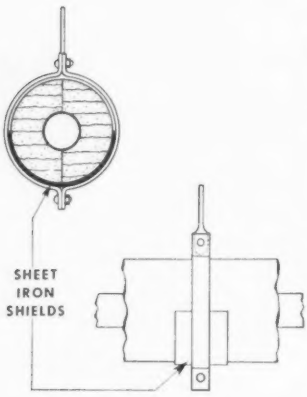
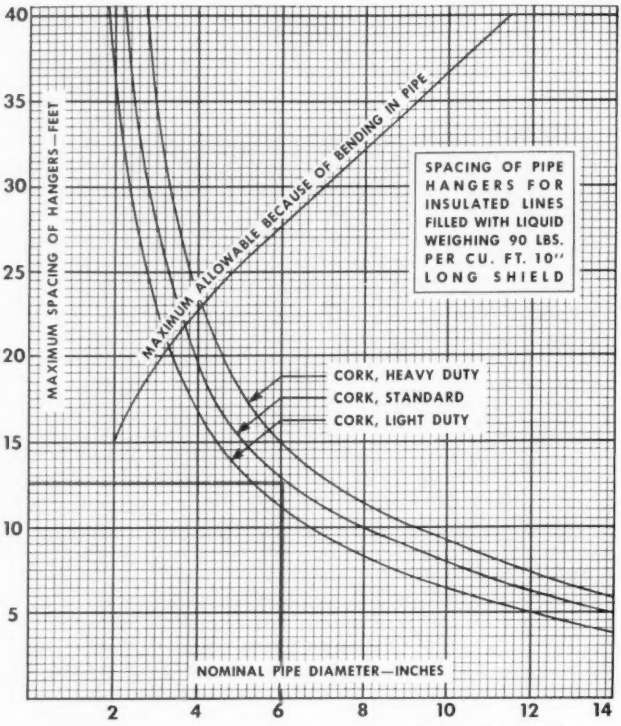
MINNEAPOLIS Honeywell

BROWN® INSTRUMENTS





WE HAVE BEEN ASKED:

What is the proper spacing of hangers to support cork insulated lines?

Recently we received a letter which posed the following problem:
"We are redesigning some process piping, and we want to make sure that we correctly space the hangers on our cold lines to avoid compression of the cork covering."

To answer his question we sent this manufacturer the graph shown above. It is a dependable guide to the efficient spacing of hangers. Here's an example of how it works:

Let's assume that lines are filled with liquid weighing 90 lbs. per cubic foot. Shields are 10" long—made of 16-gauge sheet iron—and enclose half the circumference of the covering. Now let's assume that we are going to insulate a 6" pipe with standard thick cork covering. First, draw a red line, as we've done on the graph above, from the 6" indication at the bottom of the graph to the point where it intersects the line marked Cork, Standard. Then carry the line to the left. Read the figure at the point where it reaches the left-hand margin. That figure tells how many feet apart hangers should be spaced. Under the conditions of this problem—12½ feet.

While this chart applies only to liquids weighing about 90 pounds per cubic foot and for 10" shields of 16-gauge sheet iron, similar charts can be developed for other liquids and methods of hanging cork covering. So the next time you plan a cold line installation call in your Armstrong engineer.

He'll be able to give you the best hanger specification for your particular needs. You'll find that he can help you in other ways, too, because almost every insulation job presents some problems that his knowledge and experience can help solve.

IF YOU HAVE ANY QUESTIONS on low- or high-temperature insulations, feel free to call the engineer in your nearest Armstrong district office or write to the Armstrong Cork Company, 2303 Concord Street, Lancaster, Pennsylvania.

ARMSTRONG'S INDUSTRIAL INSULATIONS
MATERIALS - INSTALLATION
FOR ALL TEMPERATURES FROM 300°F. BELOW ZERO TO 2800°F.

the 7th big reason why

Dowfume EB-15

is "Tops" for food machinery and spot fumigation

1. Highly effective against all common pests of food processing establishments.
2. Low volatility.
3. Nonflammable.
4. Has a warning odor as a safety factor.
5. Economical.
6. Time-saving, because fast-acting and easy to apply without special equipment.
7. Residual effect delays reinfestation of stock.

Any one of these reasons shows why Dowfume EB-15 is first choice for food machinery and spot fumigation. Taken all together, they demonstrate the broad effectiveness of this outstanding fumigant material.

Dowfume EB-15 is particularly suited to spot fumigation because of its low volatility. This enables the fumigant to remain effective for considerable periods of time, particularly when applied on dead stock. Impartial research men have found that Dowfume EB-15 can remain effective in dead stock as long as 30 days after application. It can be applied successfully to any type of machinery that is reasonably tight, or can be made so, in order that the vapors are retained for a sufficient length of time to kill pests. Treatments are suggested at monthly intervals or as needed. It is highly important to use spot fumigation during intervals between general space fumigation.

For further information or for the source of this service in your locality, write our Fumigant Division.

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington • Atlanta • Cleveland • Detroit
Chicago • St. Louis • Houston • San Francisco • Los Angeles • Seattle
Dow Chemical of Canada, Limited, Toronto, Canada

When you use fumigants . . . insist upon
Dow Methyl Bromide • Dowfume EB-15
Dowfume EB-5 • Dowfume MC-2
Dowfume 75 • Picride

DOW

CHEMICALS

INDISPENSABLE TO INDUSTRY
AND AGRICULTURE

Ask any Dietitian—she'll tell you

"Enriched Foods and Fortified Foods are *Preferred* Foods"

AMERICAN dietitians and nutritionists long ago added their endorsement to the Bread and Flour Enrichment Program. And again they have been proved right by the results of the large-scale Newfoundland Nutrition Surveys.

These authoritative surveys reaffirmed that enriched and fortified foods promote better bodies, *healthier* bodies, sharply reduced infant mortality, lower tuberculosis and over-all death rates—improvement in both the quantity and quality of life.

When you enrich and fortify with Merck Vitamin Products you *know* that the faith of millions of Americans is fully protected. Merck Vitamin Products come from the same organization that pioneered in the research and large-scale development of thiamine, riboflavin, niacin, vitamin C, and other important nutrients. And now, the most recent contribution is thiamine mononitrate, a form of thiamine that has the advantage of greater stability in certain food applications.

With the enrichment program, as well as general food fortification, steadily growing in stature, Merck continues to lead in every distinct, forward step.

Merck Vitamin Products for Enrichment and Fortification

VITAMIN B_1
Thiamine Hydrochloride · Thiamine Mononitrate

RIBOFLAVIN (Vitamin B_2) **NIACIN** (Nicotinic Acid)

ASCORBIC ACID (Vitamin C)

Merck Enrichment Ingredients for Millers, Bakers, Cereal and Macaroni Manufacturers • Merck Vitamin Mixtures for Flour Enrichment • Merck Bread-Enrichment Wafers • Merck Vitamin Mixtures for Corn-Products Enrichment • Merck Vitamin Mixtures and Wafers for Macaroni Enrichment.

MERCK & CO., INC.
Manufacturing Chemists RAHWAY, N. J.
New York, N. Y. • Philadelphia, Pa. • St. Louis, Mo.
Chicago, Ill. • Danville, Pa. • Elkton, Va. • Los Angeles, Calif.
In Canada:
MERCK & CO. Limited Montreal • Toronto • Valleyfield

Merck Knows Vitamins

MERCK

Merck Vitamin Products for Enrichment and Fortification

CORROSION NOW POSES A DOUBLE THREAT

Worn out and corroded equipment may not be replaceable

Don't take chances on vital equipment. Scarce metals and materials are becoming scarcer. Farsighted business men are rebuilding, repairing and *protecting* to insure continuity of their operations.

Do these two things today:

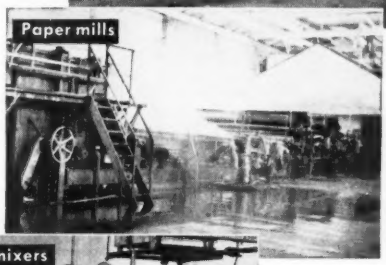
1. Check up in your plant—manufacturing equipment, piping, valves, tanks, motors, and all similar items.
2. Arrange to protect them with Amercoat—the corrosion-resistant coatings; each designed to meet specialized conditions.

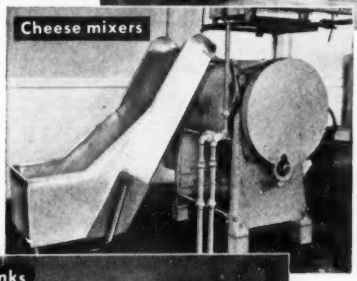
Note: Most conventional coatings fail under severe service conditions. They are neither designed nor suitable for such applications.

AMERCOAT CORPORATION

A Division of American Pipe and Construction Co.
4809 Firestone Blvd., South Gate, California

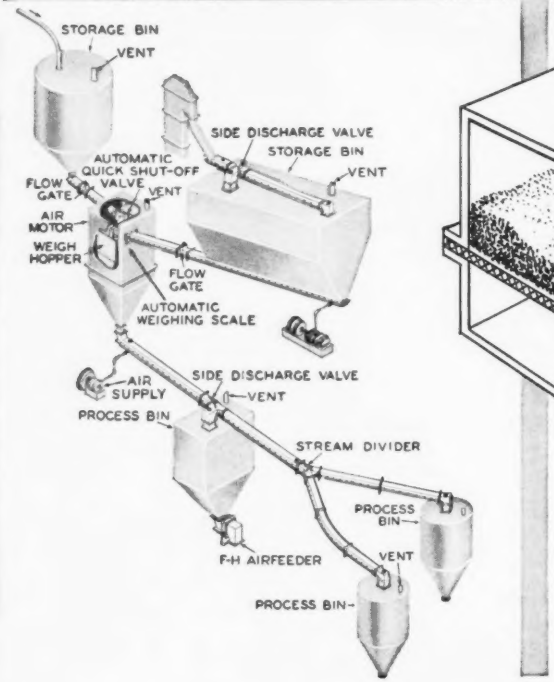
FOLLOW THE LINE OF *most* RESISTANCE

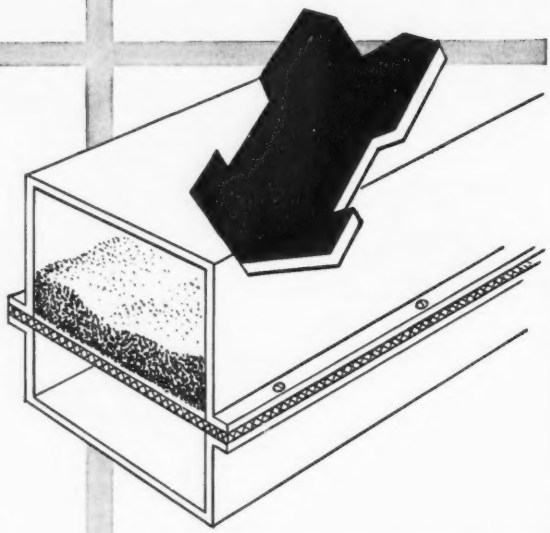




only the *material* moves

in the F-H Airslide®





It's simple—it's safe—it's sure—it's sanitary—it saves—this improved method of *flowing* fine dry materials. The **F-H Airslide** is being more and more widely considered by food processors as the ideal way of moving flour, starch, and other such materials. It eliminates dusting, saves man-hours, keeps production flowing smoothly at minimum operational cost.

The **F-H Airslide** consumes little power—only that required for a small volume of air at low pressure. Valuable floor space is saved, and the system can be installed with a flexibility impossible to obtain with a conventional conveyor.

Food processing plants of every size and type will find the **F-H Airslide** the solution to the problem of transporting fine, dry foodstuffs, with maximum efficiency and economy.

A Fuller Engineer can show you how the system can be put to work for you—prove you can increase efficiency while you reduce operating costs. Why not contact him today?

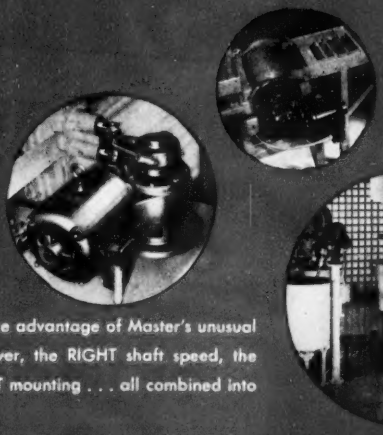
Fuller

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS—COMPRESSORS AND VACUUM PUMPS—FEEDERS, AND ASSOCIATED EQUIPMENT

FULLER COMPANY
Catasauqua, Pa.
120 S. La Salle St., Chicago 3
420 Chancery Building, San Francisco 4

7551

FH-19



On big jobs or little ones it pays to take advantage of Master's unusual ability to supply the RIGHT horsepower, the RIGHT shaft speed, the RIGHT construction features, the RIGHT mounting . . . all combined into one compact power package.

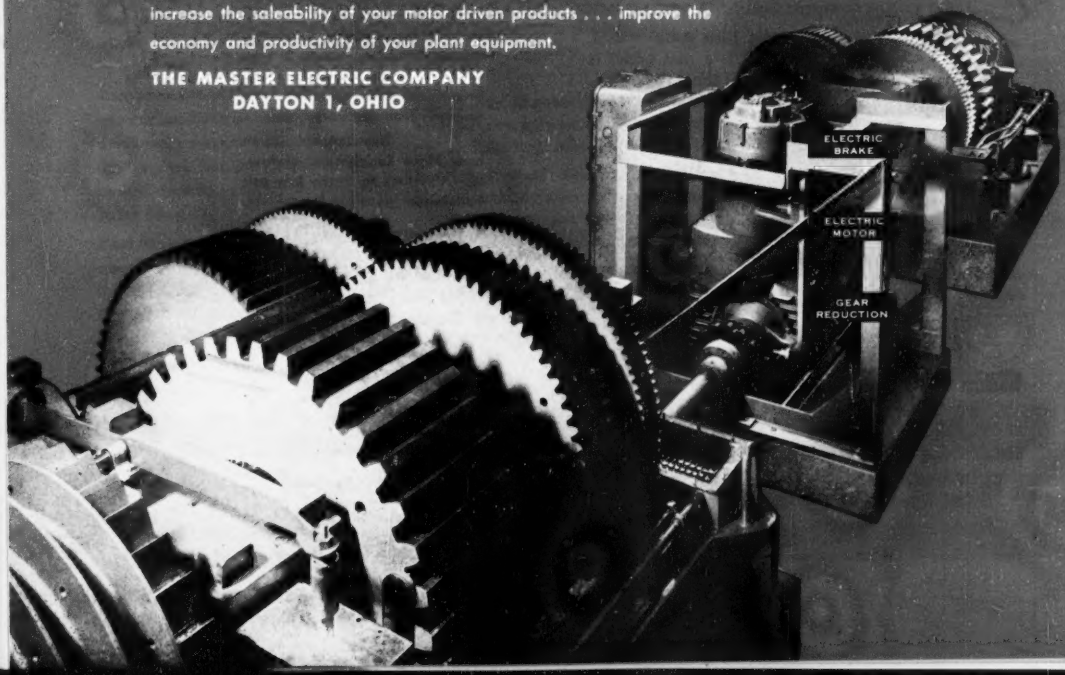
Don't put up with make-shift assemblies when you too may be enjoying these advantages. Master Motors, available in thousands and thousands of types and ratings (up to 150 HP) give you a selection you can get nowhere else.

Open, enclosed, splash proof, fan-cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 432 to 1 ratio . . . with electric brakes . . . with mechanical variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best motor drive for YOU.

little ones or BIG ones

Select the RIGHT power drive from Master's broad line and you can increase the saleability of your motor driven products . . . improve the economy and productivity of your plant equipment.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO



A SALUTE TO THE BAKERS AND MILLERS OF AMERICA ON THE 10TH ANNIVERSARY OF ENRICHMENT

1941-1951

This year, on its 10th Anniversary, the enrichment of flour and bread is being hailed as one of the most significant contributions of our time to the health and well-being of the American people.

Both bakers and millers can be justly proud as the country's leading scientists and nutritionists give their praises and endorsements to the enrichment program.

Sterwin is happy to have played a part in the development of this program.

B-E-T-S, **the *Original* Bread-Enrichment Tablets, made it possible for bakers to enrich their bread *easily, accurately* and *economically* from the very first.**

VEXTRAM, **the *Original* starch base Flour Enrichment mixture, was the first to make low-ash enrichment possible for millers.**

Let Sterwin's Technically-Trained Representatives show you how to give extra nutritional values to your food products by the addition of Sterwin vitamins and enrichment concentrates.

Member

BRANCH OFFICES: Atlanta, Boston, Buffalo, Chicago, Dallas, Kansas City (Mo.), Los Angeles, Minneapolis, Portland (Ore.), St. Louis

Sterwin Chemicals INC.

Subsidiary of Sterling Drug Inc.
1450 BROADWAY, NEW YORK 18, N.Y.

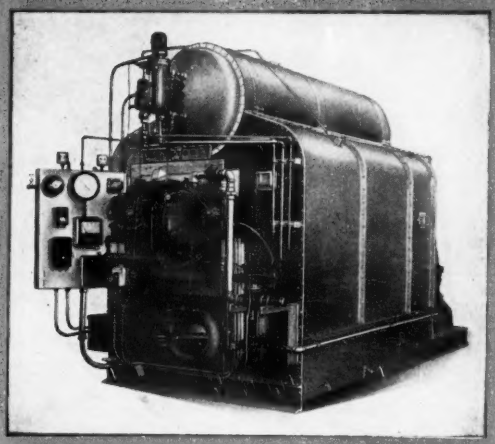
Pioneers in Food Enrichment

Distributor of the products formerly sold by Special-Markets-Industrial Division of Winthrop-Stearns Inc., and Vanillin Division of General Drug Company

Here's What You Get...

for your KEYSTONE *dollar*

The Erie City Keystone Steam Generator combines a low headroom, 2-drum water tube boiler; insulated steel casing; automatic burner for either oil or gas or both, interchangeably; control panel with all instruments and safety controls wired and piped at the factory; induced draft equipments—all mounted on a common base and shipped as complete units in sizes to 800 h.p.



150 hp. Erie City Keystone Steam Generator with Combination Oil or Gas Burner.

Compact Design—The Keystone packs large steam capacity in small cubage, because of its unique furnace, contained within a low-head 2-drum water tube boiler.

Conservatively Rated—The Keystone offers unusually large heating surface per developed horsepower. Ratings are based on 5 square feet per developed horsepower—accepted practice in water tube boiler design.

Fast Steamer—The Keystone is highly responsive to changing load demands, for hot gases travel 3 lengths of the furnace, contacting 5 bare metal heat absorbing zones. Big boiler performance in small space.

Centralized Control—All specified instruments and controls, factory assembled, and mounted on a central instrument panel. All electrical connections to terminal blocks eliminate inter-connecting field wiring.

Automatic Burner—The Keystone is equipped with fully automatic burner for gas, oil or for both interchangeably.

Insulated Steel Casing accurately fitted to reduce radiation losses and air infiltration—removable panel type—all tubes accessible.

Combustion Control—interlocked electrical controls, steam pressure actuated for smooth adjustment of fuel, primary and secondary air supply to obtain most efficient high and low flame position.

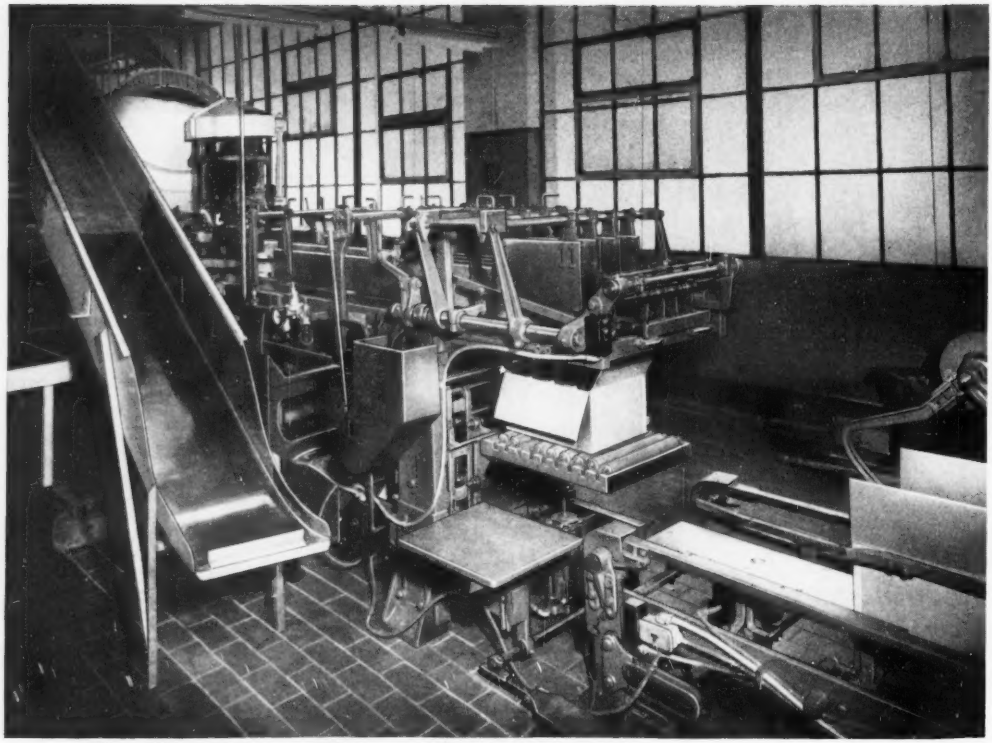
Induced Draft equipment is of low speed, conoidal type with automatic damper control on panel.

Safety Controls include automatic cut-offs for high pressure, low water, flame failure, induced draft failure and fire switch.

Easy to install—easy to maintain—Keystone requires no special foundation or stack—just set in place and hook up service connections. Wind box is hinged for easy furnace inspection, hinged burner swings out for inspection—removable side panels give access to any tubes—manholes provide access to drums and tubes.

WRITE FOR BULLETIN SB-31 TODAY:

ERIE CITY IRON WORKS *1453 East Ave.* **ERIE, PA.**



For Packing Glass Containers

Standard-Knapp equipment is high speed, precise and economical. Containers are under complete control throughout the operation. Load forming is automatically regulated to assure a full pack for every case. Damage to containers or cases is eliminated.

Standard-Knapp Bottle Packers are more than equal to the challenge of higher production at lower costs. That is why they are the first choice with leading manufacturers and processors of food, beer, carbonated beverages, and chemicals.

Only the best is

PRODUCTS OF OUR ASSOCIATES INCLUDE:

PLASTIC BOTTLES, RODS, TUBES, SPECIAL SHAPES

PLAX CORPORATION

Subsidiary of Hartford-Empire Company

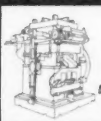
HARTFORD 1, CONNECTICUT

PREMIUM QUALITY STAMPING PRESSES

THE V & O PRESS CO.

Division of Hartford-Empire Company

HUDSON, NEW YORK



HIGH SPEED AUTOMATIC PRESSES

HENRY & WRIGHT

Division of Hartford-Empire Company

HARTFORD 5, CONNECTICUT

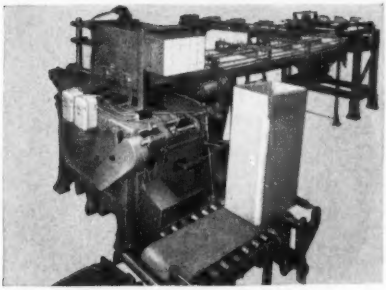
GLASS MAKING MACHINES

GLASS DIVISION

Hartford-Empire Company

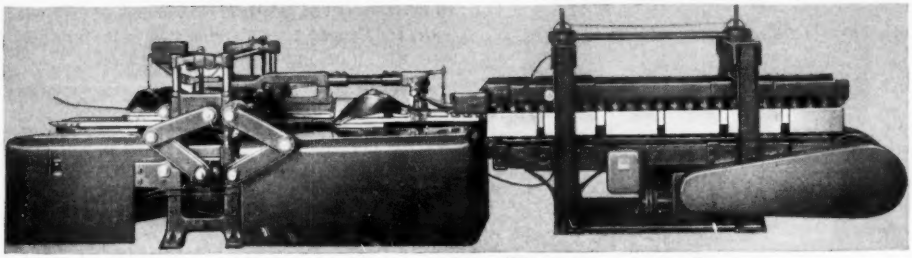
HARTFORD 2, CONNECTICUT

In the field of automatic packaging equipment



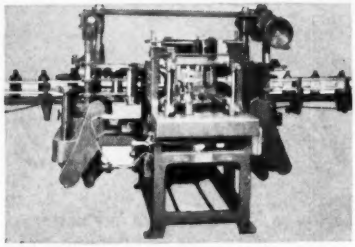
For Packing Cartons

into cases, Standard-Knapp equipment is preferred for its high speed, safe handling and adaptability to varying load patterns. Standard-Knapp Carton Packers are used by foremost manufacturers of soaps, chemicals, cigarettes, pharmaceuticals and cosmetics.



For Glueing and Sealing

shipping cases, Standard-Knapp machines have set the standard of performance for years. If you have heard of gluers and sealers, you have heard of Standard-Knapp.



For Automatic Labeling

of glass and tin containers, it's Standard-Knapp equipment for neat, clean and tight label application. In the food field, where high quality labeling is a must, Standard-Knapp Labelers are preferred.

good enough

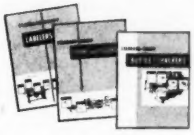
STANDARD-KNAPP

DIVISION OF
HARTFORD-EMPIRE COMPANY

PORTLAND, CONNECTICUT

FACT-PACKED CATALOGS

Want to review Standard-Knapp automatic packaging machines in detail? Our catalogs will give you some eye-opening facts. Please write Dept. F, Standard-Knapp, Portland, Connecticut.



50 years of

—A GUARANTEE OF

To the business and industrial communities of the United States and Canada, Canco's pioneering in the future will mean what it has meant for the last 50 years:

Not only better containers, but also new containers to meet the needs of our never-static economy . . .

Plus improved methods of packaging and processing, faster machinery, and the fulfillment of the vision of a research organization without equal in the field.

In the distributing industries, Canco's pioneering will continue to pay dividends in easier, safer, and more

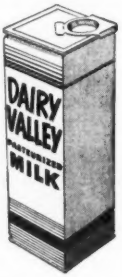
The sanitary can—most famous of all metal containers—made commercial canning of fruits and vegetables possible—revolutionized the grocery business—changed America's eating habits.

American

CONTAINERS . . . to help people live better

The "Double-Tite" paint can expanded the paint business—brought ready-mixed paints to millions by making it practical for these paints to be packed and shipped everywhere.

The vacuum-pack coffee can—permitted roasters to protect from roaster to consumer the flavor and aroma of fresh-roasted coffee.



Canco's Paper Milk Container—gave tremendous impetus to store milk sales for dairies all across the country—allowed grocers to give housewives milk in a sanitary, easy-to-carry, one-way container.

Canco Pioneering

LEADERSHIP IN THE DAYS AHEAD.

economical handling of packaged goods.

And to everyone who eats, patronizes a drugstore, drives a car, maintains a home, serves in our armed forces—Canco's pioneering will continue to make possible a myriad of products . . . of better quality.

As we look ahead with determined resolve to the next half-century, we affirm this steadfast purpose: *Canco will contribute even more* to industry and government, and bring even better living to even more people.

On this page are familiar containers of today pioneered by Canco.

The meat can boomed the canned meat business—provided housewives with a new and wide variety of readily prepared meats.

An adaptation of the sanitary can, this container assured motorists of getting refinery-sealed motor oil. Gave huge boost to sales in service stations in every state.

Can Company

CANCO

New York • Chicago • San Francisco
Hamilton, Canada

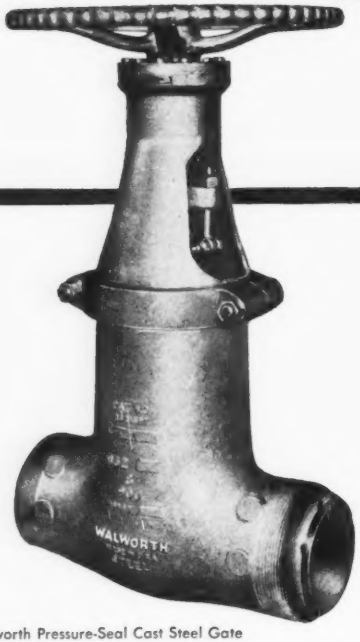
The beer can trademarked "Keglined"—the first non-returnable container for beer and ale—brought new conveniences to beer drinkers everywhere—lowered distribution cost.

This container protected first-aid units of blood plasma in World War II. An adaptation of Canco's tennis ball can.

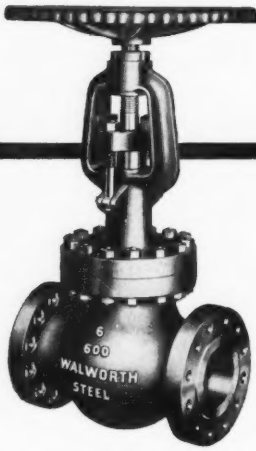
The salt container prevented excessive caking which took place in the old-fashioned bags. The aluminum pouring spout made easier the housewife's task.

Walworth Series 150 Cast Steel Valves are tough and wear-resistant. Gate valves are available in sizes from 2" to 24", and globe valves in sizes 2" to 12".

Years of trouble-free service assured with . . .



Walworth Pressure-Seal Cast Steel Gate Valves exemplify the greatest improvement in high-pressure, high-temperature valve design. The internal pressure keeps the body-to-bonnet joint tight. Series 600: 1½" and larger — Series 900: 3" and larger — Series 1500: 1" and larger.



Walworth Series 600 Cast Steel Valves have strength and ability to resist wear. They assure long life and positive operation. Available in either gate or globe types — Gate: sizes 1½" to 18" — Globe: sizes 2" - 8".

WALWORTH cast steel valves

Walworth Cast Steel Valves have proved their ability to assure years of trouble-free, dependable service. Accurately threaded stems, deep stuffing boxes, streamlined ports, and heavy cast alloy steel walls are their top features.

You can get full information about Walworth's complete line of steel, iron, and bronze valves and fittings from our new Catalog 47. See your nearest Walworth distributor, or write on business stationery for your free copy.

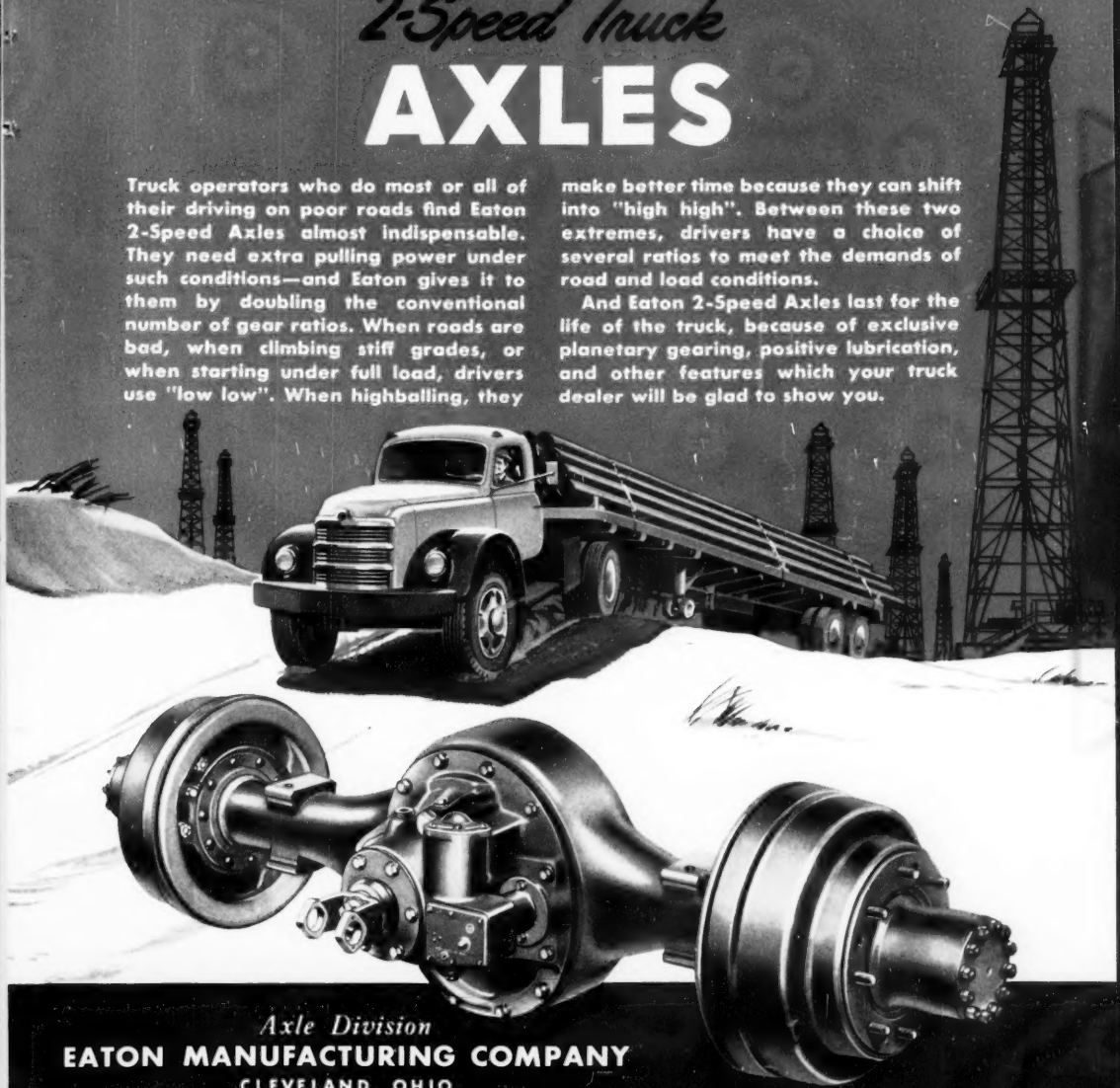
Walworth Cast Steel Fittings are manufactured in a wide range of types and sizes to meet every requirement. They are made to the highest standards of quality, both as to dimensional accuracy and metallurgical properties.

WALWORTH
valves and fittings
60 EAST 42nd STREET, NEW YORK 17, N. Y.

Roads or Ruts—
Trucks Make Faster Time with
EATON
2-Speed Truck
AXLES

Truck operators who do most or all of their driving on poor roads find Eaton 2-Speed Axles almost indispensable. They need extra pulling power under such conditions—and Eaton gives it to them by doubling the conventional number of gear ratios. When roads are bad, when climbing stiff grades, or when starting under full load, drivers use "low low". When highballing, they make better time because they can shift into "high high". Between these two extremes, drivers have a choice of several ratios to meet the demands of road and load conditions.

And Eaton 2-Speed Axles last for the life of the truck, because of exclusive planetary gearing, positive lubrication, and other features which your truck dealer will be glad to show you.



Axle Division

EATON MANUFACTURING COMPANY

CLEVELAND, OHIO

PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • JET ENGINE PARTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS SPRINGTITES • SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS

HARD TO BEAT!

Not One, Not Two, But FIVE Conveniently located Betner Plants

make our food packaging service flexible and economical

DEVON, PA.
RICHMOND, VA.
APPLETON, WIS.
PARIS, TEXAS
LOS ANGELES, CAL.

Pinpointed for service to food processors everywhere . . . that's the big idea behind the locating of these Betner Better Bag plants. Where do you have your business? What kind of bag do you need for your product? Betner has it . . . and can get it to you quickly.

Backing up our idea of what a complete bag service should be is a widely-flung sales organization, one or more members of which are near you. Betner Bags are, in effect, as close to you as your classified directory.

NEW! BETNER'S "NO SIFT" BAG
for toxic dry chemicals, powders

If there's any bag that positively *won't* permit dry particles to sift, this is it. Its construction combines special liners with folding, gluing and heat-sealing in such a way that there is virtually "No Sift" for contents.

Betner not only supplies this new bag—now—but special closing machinery for closing it. Your inquiries are welcome. Samples, with full technical information, will be supplied promptly.

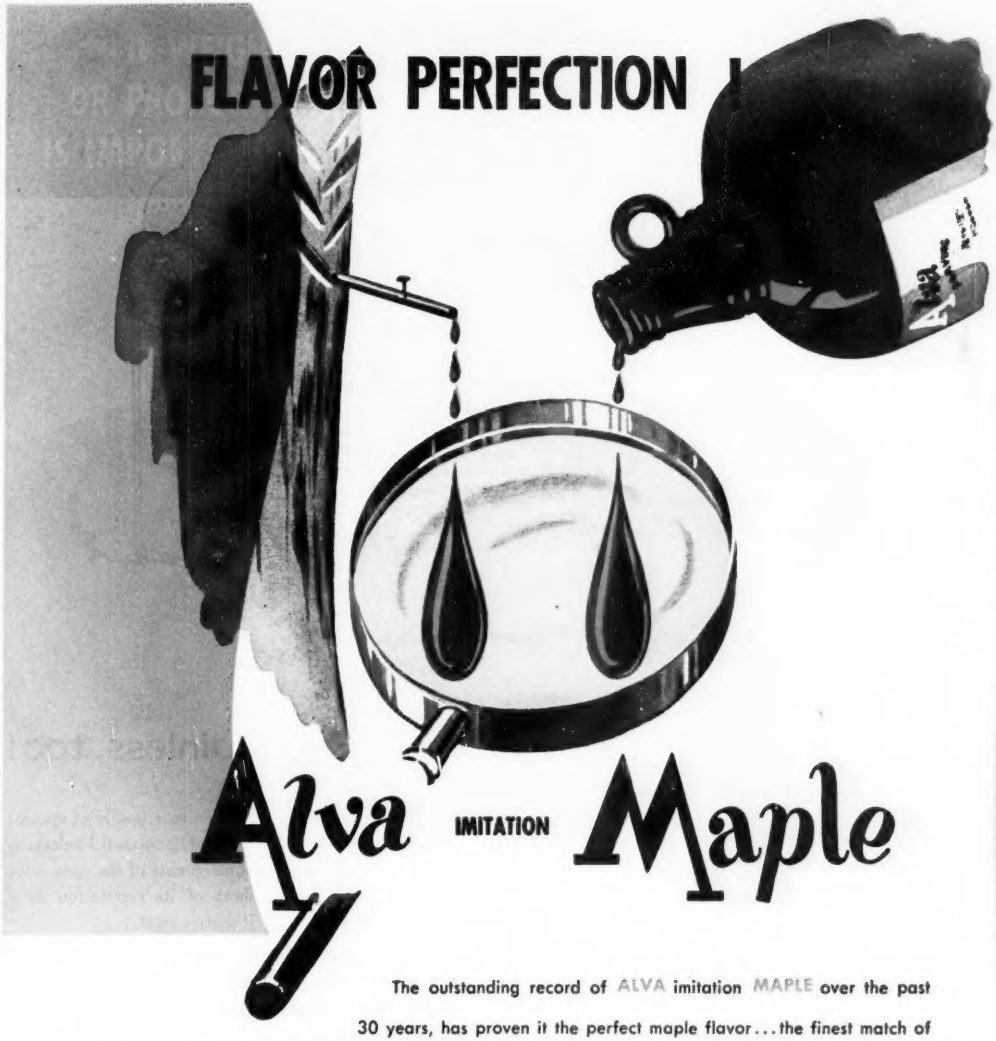
LOOK FOR BETNER IN BOOTH NO. 655 at the National Packaging Exposition

Benj C Betner Co DEVON, PA.

BENJ. C. BETNER CO. of VA., Richmond, Va.; BENJ. C. BETNER of WISCONSIN, Appleton, Wisconsin; BENJ. C. BETNER CO., Paris, Texas; BENJ. C. BETNER CO. of CALIFORNIA, Los Angeles, California; SOUTHERN PACKAGING CORPORATION Affiliate of Benj. C. Betner Co.

A complete bag service—from idea to finished bag to machinery for closing coffee bags and filling and closing liner bags for cartons.

FLAVOR PERFECTION



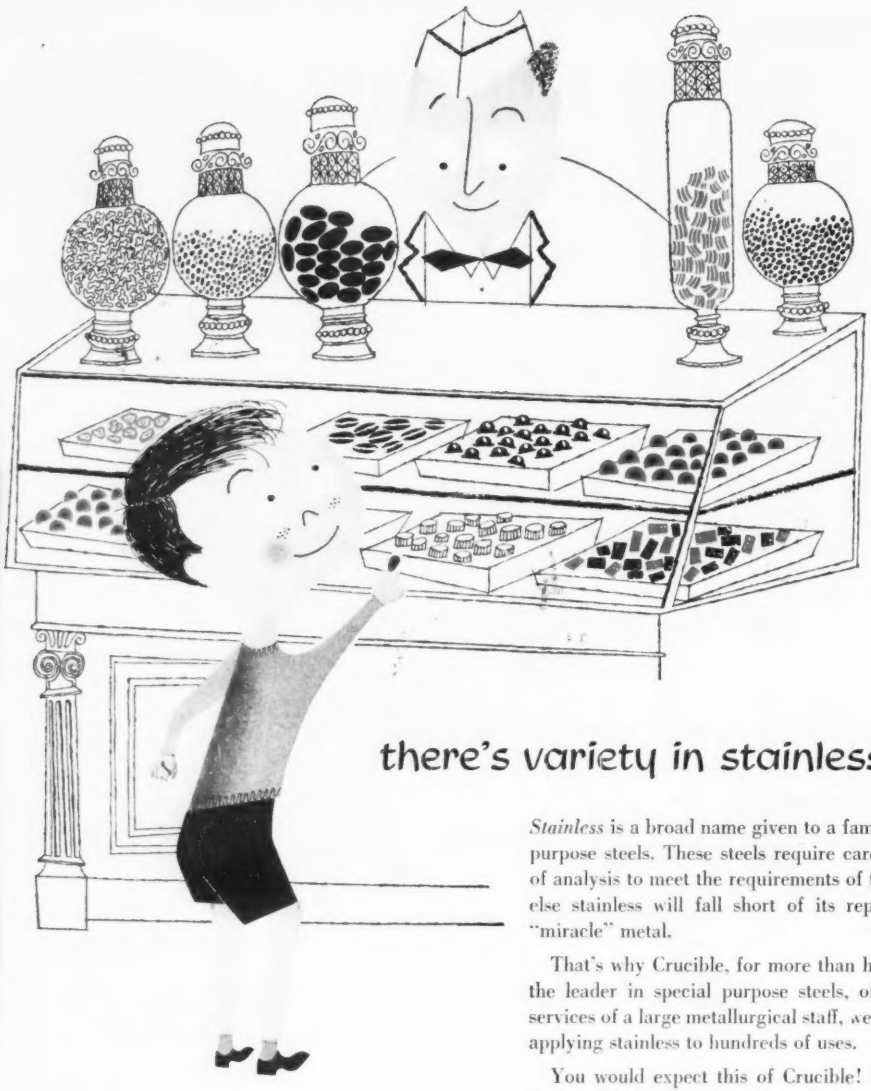
Alva IMITATION Maple

The outstanding record of ALVA imitation MAPLE over the past 30 years, has proven it the perfect maple flavor... the finest match of the true flavor goodness of real sugar maple for baking, confections, ice-cream, extracts and syrup. On the basis of price, ALVA MAPLE will please you too. If you are not using ALVA MAPLE now... write us for a sample.

Do you have your copy of the complete Alva Flavors Catalog?

VAN AMERINGEN-HAEBLER, INC.
521 WEST 57th STREET, NEW YORK 19, N. Y.

Alva FLAVORS



there's variety in stainless, too!

Stainless is a broad name given to a family of special purpose steels. These steels require careful selection of analysis to meet the requirements of the user — or else stainless will fall short of its reputation as a "miracle" metal.

That's why Crucible, for more than half a century the leader in special purpose steels, offers you the services of a large metallurgical staff, well-schooled in applying stainless to hundreds of uses.

You would expect this of Crucible! For Crucible was one of the first to build — from the ground up — a completely integrated mill to roll stainless exclusively. If yours is a stainless steel application, call on our unequalled background of experience. CRUCIBLE STEEL COMPANY OF AMERICA, Oliver Building, Pittsburgh, Pennsylvania.

CRUCIBLE first name in special purpose steels

51 years of Fine steelmaking

STAINLESS • HIGH SPEED • TOOL • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

IF WEIGHING, BLENDING OR PROPORTIONING MATERIALS IS IMPORTANT TO YOU . . .

THIS NEW GUIDE IS MUST READING

Richardson's new guide to automatic weighing, blending or proportioning of materials points out *new methods-new equipment applications* in these important processes. Simply find your material in the index, refer to the equipment section and you're on your way to improving your present operations through increased speed, economy and accuracy.

Let Richardson's 50 years of experience in building Automatic Weighing, Proportioning and Blending, equipment help you discover new and improved methods in your field—no matter what you handle.

Write today for your free copy of this guide Bulletin No. 0450.

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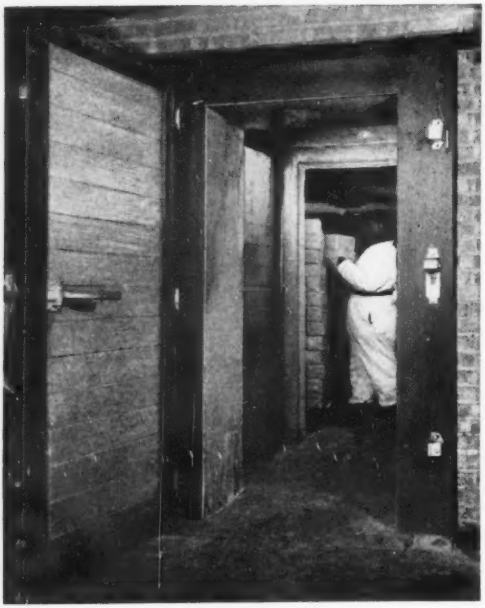
Richardson
MATERIALS HANDLING BY WEIGHT SINCE 1902

7489

JAMISON super freezer doors

for modern ice cream plant

Model Walgreen Chicago Commissary and Ice Cream Plant
One of Nation's Largest



OUTSIDE . . . Sturdy Metal-Clad Door

America's "biggest names in cold storage" regularly team up with America's "biggest name in cold storage doors." This time it's WALGREEN and JAMISON. Through Jamison Super Freezer Doors on Walgreen loading docks pass 3,000 gallons of ice cream, stored at 20 degrees below zero temperature. E-Z Open Two-Point Fasteners maintain tight seal.

INSIDE . . . Sanitary Stainless Steel Clad Doors

Jamison Stainless Steel interior doors harmonize with immaculate tile and other stainless steel equipment. Vertical Stainless Steel clad, smooth-sliding door along side permits the rapid, trouble-free handling of 1,000 gallons of ice cream in a single hour—carried on conveyors in pint containers! Get all the IMPORTANT facts. Write for Catalog today. Jamison Cold Storage Door Co., Hagerstown, Md., U. S. A.

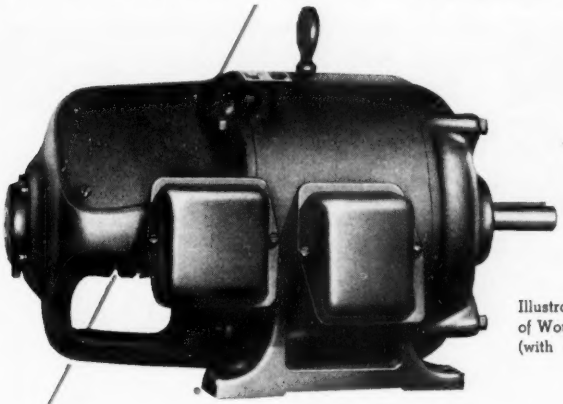
JAMISON
HAGERSTOWN, MARYLAND, U. S. A.

The oldest and largest builder of insulated doors in the world.

Century

WOUND ROTOR MACHINES

Are Available for *MANY* Industrial Uses . . .



Illustrating Century Line of Wound Rotor Machines (with covers).

For *Compressors • Cranes • Hoists • Bending Rolls • Refrigerators • Bridges • Synchro-Speed Drives • Printing Presses • High Frequency Current*

Century Polyphase Wound Rotor machines are adaptable to many applications that require

1. Adjustable varying speeds or reversing direction of rotation — such as bending rolls, fans and blowers, newspaper printing presses, etc.
2. Synchro-speed, multiple drives to be used when two or more industrial operations must be synchronized.
3. Converters — to supply high frequency current for high speed electric motor-driven machines and hand tools.
4. High starting torque with low starting current — for such applications as cranes, hoists, lift bridges, turn tables and car dumps.

Century Electric Wound Rotor Machines are built in sizes up to 400 horsepower and are available in open protected or splash proof frames.

Century builds a complete line of electric motors in a wide range of types and kinds, in sizes from 1/6 to 400 horsepower.

Specify Century motors for all your electric power requirements.

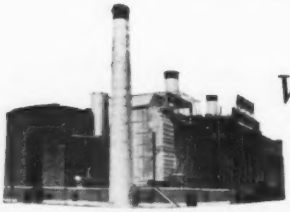
Century C MOTORS

Century Electric Company is celebrating its 50th year in the electrical industry.

CENTURY ELECTRIC COMPANY • 1806 Pine St. • St. Louis 3, Mo.

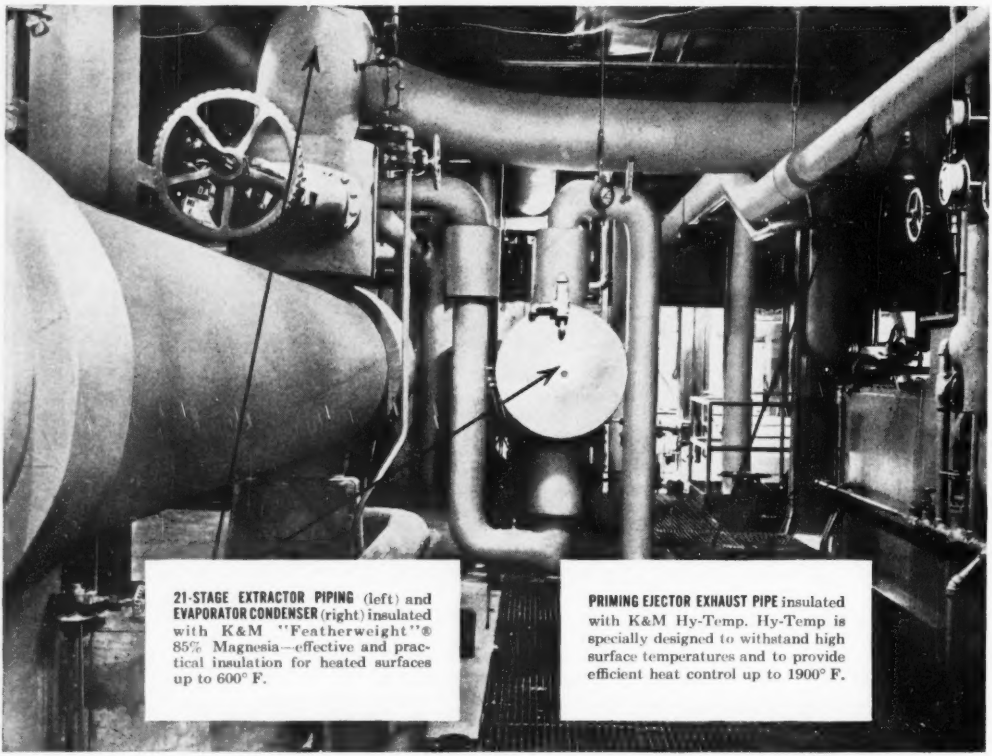
Offices and Stock Points in Principal Cities

CE-603



Where the best in insulation is a must

Public Service Co. of Oklahoma uses
K&M Insulations in Weleetka Power Station



21-STAGE EXTRACTOR PIPING (left) and **EVAPORATOR CONDENSER** (right) insulated with K&M "Featherweight"® 85% Magnesia—effective and practical insulation for heated surfaces up to 600° F.

PRIMING EJECTOR EXHAUST PIPE insulated with K&M Hy-Temp. Hy-Temp is specially designed to withstand high surface temperatures and to provide efficient heat control up to 1900° F.

Insulation Contractor: Armstrong Cork Company

These K&M insulations keep steam hotter—longer—at less cost!

In power stations, oil refineries, chemical plants, factories, steamships, hospitals—in fact, wherever exacting steam control is a must—you'll find K&M "Featherweight" 85% Magnesia and K&M Hy-Temp Insulations. These two K&M products give you highly efficient, cost-cutting insulation in every service temperature range. And, for especially difficult heat control situations, the advantages of both are combined in K&M Hy-Temp Combination Insulation.

Your Keasbey & Mattison Distributor—who is an experienced applicator—will be glad to give you complete information on these or any K&M Insulations. Or, write us.

Nature made Asbestos...
Keasbey & Mattison has made it serve mankind since 1873

K&M Heat in asbestos®

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

WANTED!
HIGH PERFORMANCE TRACTOR NEEDED IN THE 40,000 G.C.W. RANGE.* MUST HANDLE ITS JOB WITH ALL THE POWER, STAMINA AND ECONOMY OF FAMOUS BIG "L" MODEL MACKS. ONLY A HUSTLING, STEADY WORKER NEED APPLY.
SOUTHERN
556
SOUTHERN EXPRESS
THE RELIABLE LINE
Mack

MACK A-40 T gets the job!

The country over, motor carriers are acclaiming the new Mack A-40 T as the answer to a definite need for BIG-MACK performance and stamina in a medium-capacity tractor.

And with good reason! Here's a highway tractor rated at 40,000 lbs. g.c.w. that brings to its field all the benefits of rugged Mack construction formerly available only in the famous "L" model Macks of larger capacity.

Throughout the entire chassis, this BIG-MACK construction shows in every part. Mack A-40 T is powered by the sensational *Magnadyne* engine of 377 cu. in. displacement, designed especially for modern high-speed hauling needs. Completely Mack-built in Mack factories, this great new powerplant is a worthy running mate for Mack's renowned *Thermodyne* engine used in larger capacity Macks.

Perfectly balanced throughout... uniformly rugged in every part, Mack A-40 T handles tough, on-time schedules with all the unfailing reliability, matchless economy and extended mileage life for which Mack trucks have always been famous. See your nearest Mack branch or distributor for the full story of the profit-building advantages Mack A-40 T can bring to your particular job.

*53,000 lb. G.C.W. with tandem-axle trailer.

BE PROFIT-WISE

modernize with

Mack TRUCKS

outlast them all

Mack Trucks, Empire State Building, New York 1, New York. Factories at Allentown, Pa.; Plainfield, N. J.; Long Island City, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

Make the most of this combination....

1. *Continuing basic research . . .* in corn products chemistry, directed by the foremost research men in the industry.

2. *Technical and engineering services . . .* to help you apply new methods and new products to your production setup. No obligation for on-the-spot studies. (Write our Technical Sales Department.)

3. *Fine products of uniform quality . . .* from a dependable, large volume source of supply.

● Globe, Cerelose, Puritose, Buffalo and Hudson River are registered trade-marks of Corn Products Refining Company, New York, N. Y.

CERELOSE BRAND dextrose

PURITOSE BRAND CORN SYRUP

GLOBE BRAND CORN SYRUP

CORN PRODUCTS REFINING COMPANY, 17 BATTERY PLACE, NEW YORK 4, N. Y.

Since 1936...

"Continuous service without a break-down"

Back in 1936, officials of this large meat packing plant specified stainless steel in new equipment for its sanitation and resistance to corrosion. The equipment was fabricated of Republic ENDURO Stainless Steel. Not one single failure has occurred. All items have withstood wear and corrosion very well. Maintenance has been low. Replacement has been unnecessary. Critical materials have been saved—a factor which will be of even greater importance in the days ahead.

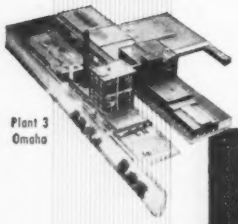
ENDURO Stainless Steel is your right choice for all food-contacting surfaces. It's so easy to clean . . . and to keep clean. At the end of each working period, the ENDURO chute shown here is simply washed down with hot water and purged with live steam. Then, it sparkles like new . . . free from any trace of rust or corrosion. Its smooth surface offers no foothold for food particles. It does not contaminate metallically . . . safeguards food color, flavor, purity.

Republic's metallurgical, technical and engineering staffs are ready to help you realize the utmost production from your present ENDURO equipment . . . and to advise you on the most suitable grades for your new equipment purchases. This service is confidential, and without obligation. Just write:

REPUBLIC STEEL CORPORATION
Alloy Steel Division · Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Republic
REPUBLIC STEEL
ENDURO STAINLESS STEEL

Other Republic Products include Ex-L-ite Tin Plate, Pipe, Sheets, Bolts and Nuts, Electrunite Tubing, Niles Barrels and Drums



Plant 3
Omaha

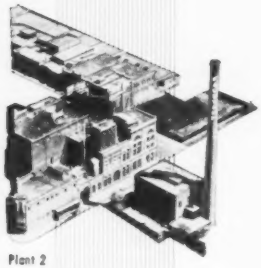
At all five great plants of . . .

Falstaff Brewing Corporation...

Plant 1
St. Louis

as in buildings that set the pace in every industry . . . you'll find

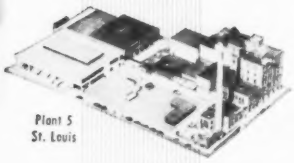
Jenkins Valves



Plant 2
St. Louis

In the brewing of Premium Quality Falstaff, Yesterday and Tomorrow meet. At five great plants — in St. Louis, Omaha, and New Orleans — Falstaff Brewing Corporation combines ancient brewing skills with the most modern brewing methods.

To produce, and maintain, the same "premium quality flavor" in different breweries is no small accomplishment. Falstaff employs not only the latest in scientific knowledge but, for absolute uniformity of product, the most dependable equipment modern engineering can devise. That is why Jenkins Valves are on the pipelines in all five Falstaff plants.



Plant 5
St. Louis

Modern brewery, super-airport, or skyscraper — wherever unfaltering efficiency and long service life are "musts" in operating equipment, you'll find Jenkins Valves. They have been the choice, consistently, of leading architects, engineers and contractors for the buildings which are shaping America's skyline of Tomorrow.

For Jenkins builds extra endurance into valves — proved by low upkeep cost records in every type of service. Yet, despite this extra value, *you pay no more* for Jenkins Valves.

For new installations, for all replacements, let the Jenkins Diamond be your guide to lasting valve economy. Jenkins Bros., 100 Park Ave., New York 17; Jenkins Bros., Ltd., Montreal.

Sold through leading Distributors everywhere

Plant 4
New Orleans

JENKINS
LOOK FOR THE DIAMOND MARK
VALVES
SINCE 1864
TRADE JENKINS MARK

Jenkins Bros.

Some things give solid satisfaction

First catch of the season—and worth all the time and trouble it took to get to your favorite stream! You get the same satisfaction when your "know-how" turns out a top quality product—a product that repays your judgment with stepped-up sales.

No doubt sugar has contributed largely to your product's success. Its quality is uniform, it has more sweetening power, and brings out better than other agents the fine flavors of higher-priced ingredients.

If you want certain acceptance for your product—as who doesn't?—you'll use the best bait—sugar. It pays off in solid satisfaction!

SUGAR
INFORMATION INC
NEW YORK 5 NEW YORK

how to make 1 milligram of

Pfizer Ascorbic Acid

do the work of ... 2

Now you can effect important savings on the antioxidant protection you give your frozen fruit and fish packs . . . for inexpensive Citric Acid can be used to double the antioxidant efficiency of Ascorbic Acid.

For example, it has been found that the usual ascorbic level can be reduced from 200 mg. per pound of frozen fruit to about 100 mg., if citric acid is added to the ascorbic. Pfizer Ascorbic-Citric Mixture 8-92 (8% ascorbic and 92% citric acids), when added at ⅓% on the basis of the weight of fruit, gives ample protection against browning and flavor deterioration. Tests have clearly shown that this and similar mixtures cut the cost of treatment by stabilizing the ascorbic acid, thereby permitting the use of much smaller quantities.

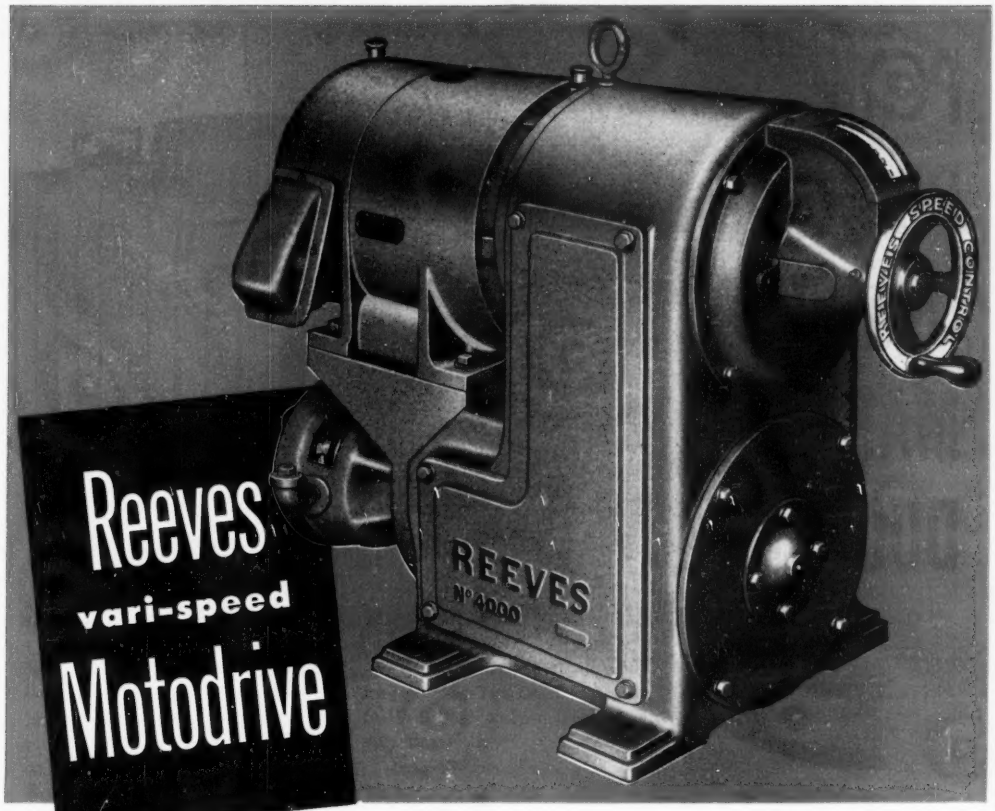
Through years of experience with clients who need to preserve the flavor and appearance of frozen fruits, fish and other frozen packs, Pfizer has acquired a wealth of practical, technical information on the use of Ascorbic and Citric Acids as antioxidants. If you have an antioxidant problem, why not drop us a line today?

PFIZER QUALITY® PFIZER

ASCORBIC ACID and ascorbic-citric mixtures

For the Frozen Food Industry — Ascorbic Acid, Ascorbic-Citric Mixtures • For the Dairy Industry — Vitamin A Acetate and Palmitate, Sodium Citrate, and Ascorbic Acid For the Milling Industry — Bi-Cap® Enrichment Concentrates • For the Baking Industry — Enrichment Wafers, Gluconic and Fumaric Acid • For the Feed Industry — Bi-Con® Terramycin and Vitamin B12 Supplements, Iodides.

Chas. Pfizer & Co., Inc., 630 Flushing Avenue, Brooklyn 6, N. Y.; 425 North Michigan Avenue, Chicago 11, Ill.; 605 Third Street, San Francisco 7, Calif.



your best buy in a complete variable speed power plant

here's why:

1 A *complete,* self-contained variable speed power plant combining motor, REEVES speed varying mechanism and speed reducer in one, space-saving unit.

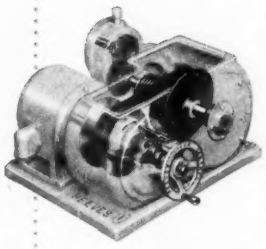
2 Available with any standard, constant-speed, foot-type motor—the same as motors on your other machines—no stocking of special motors.

3 Easily applied to machines in service. Horizontal and vertical models; speed ratios 2:1 through 6:1; sizes 1 to 20 hp; manual or automatic controls. Fractional hp units also available in ratios up to 10:1.

4 REEVES operating principle—proved in 300,000 installations—assures *positive, accurate* speed changes without stopping machine.

For *your* machines, new or old, specify REEVES Speed Control and secure all the benefits of stepless speed adjustability. For full information, send for catalog No. FD64-509.

Here Is How It Works



Phantom view of horizontal model with single reducer.

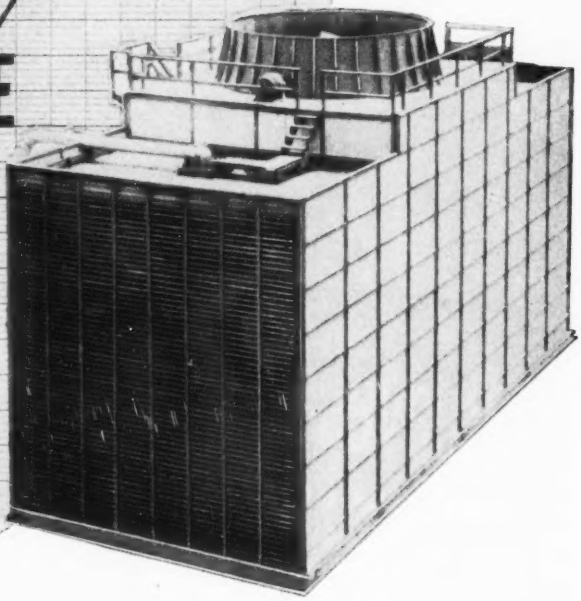
The Motodrive utilizes proved REEVES operating principle of a V-belt driving between two pairs of cone-shaped discs which are adjustable to form an infinite number of driving and driven diameters. Discs are mounted on parallel shafts. One shaft receives power at constant speed from motor—other delivers power at infinitely adjustable speeds to gear reducer from which desired speed is transmitted to driven machine.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

Recognized leader in the specialized field of speed control engineering

accurate • variable
REEVES *Speed Control*

PEAK PERFORMANCE DEMANDS MARLEY DOUBLE-FLOW



As the production curve ascends, Marley DOUBLE-FLOW owners increasingly will know the double satisfaction of a good investment and a problem solved.

Marley patented DOUBLE-FLOW design long has been accepted as the standard for functional efficiency. *Now* the exclusive DOUBLE-FLOW features that make for every-minute operation are of utmost importance.

Only DOUBLE-FLOW OPEN DISTRIBUTION permits cleaning in minutes instead of hours and without complete shutdown. Only DOUBLE-FLOW design reveals tower operating condition at a glance. And Marley MECHANICAL EQUIPMENT, engineered for cooling tower service exclusively, is a final assurance of uninterrupted service.

DOUBLE-FLOW has a definite place in your production picture . . . let your nearest Marley Application Engineer explain it without obligation or write for Bulletin DF-50.

Also Producers of
AQUATOWERS
DRICOOLERS
VAIRFLO TOWERS
NATURAL DRAFT TOWERS
SPRAY NOZZLES

The Marley Company, Inc.

KANSAS CITY 15, KANSAS

OPERATION: FLEXIBILITY

A CLEAVER-BROOKS STEAM BOILER GIVES YOU:

✓ **Quick, effortless response to fluctuating steam demands.**

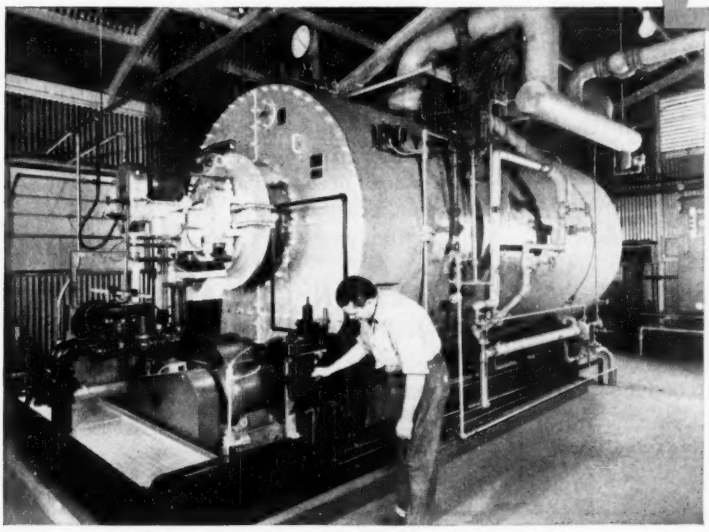
✓ **Equally high efficiency (80%) operating with oil or gas.**

Fluctuating steam loads are no problem when you have a custom-planned Cleaver-Brooks boiler in your plant. Whether your demand is heavy or light, steady or variable, these sturdy heavy-duty boilers respond instantly to your steam needs. Even with loads as low as 30% of rating, Cleaver-Brooks boilers operate with a flat 80% efficiency.

Cleaver-Brooks boilers burn either oil or gas . . . either fuel is properly proportioned to meet your steam demand and need. No banking of fires or loss of valuable heat during low load periods. You benefit with lower fuel bills, less maintenance, reduced operating costs.

If you are considering a change in your present boiler plant—think about flexibility — and get the complete facts about Cleaver-Brooks custom-planned boilers. Cleaver-Brooks self-contained boilers 15 to 500 HP, 15 to 250 lbs., p. s. i. — oil, gas, combination oil and gas firing. CLEAVER-BROOKS COMPANY, 327 East Keefe Avenue, Milwaukee 12, Wisconsin.

Cleaver-Brooks
STEAM BOILERS
the first and finest of their class



Write for a Cleaver-Brooks Steam Boiler Catalog.

Quality in Quantity

● *Gas-fired Baker Perkins oven bakes 7,200 loaves of bread per hour at Omar Incorporated, Columbus, Ohio.*

● *720 dozen doughnuts an hour are formed, proofed, fried, glazed and cooled in this Gas-fired machine.*

- **BREAD AND ROLLS**
- **PIES**
- **DOUGHNUTS**
- **CAKES**

from GAS Baking Equipment at Omar Incorporated

QUALITY in QUANTITY GAS BAKING is typical of the Columbus, Ohio, bakery of Omar Incorporated, Omaha, Nebraska. The continuous, automatic production-line methods of Omar highlight the versatility and effectiveness of GAS baking for speed and quality.

Modern Gas Baking and Frying Equipment helps produce

- **7,200 loaves of bread per hour**
- **720 dozen doughnuts per hour**
- **500 eight inch pies per hour**
- **2,340 layer cakes and 10,000 cupcakes per hour**
- **plus large quantities of sweet and plain rolls.**

Baking temperatures obtained with GAS are precise and easily controlled. Gas is clean, economical, and completely adaptable to all baking requirements.

Whether your baking volume is large or small, Gas baking gives the speed and precise temperature control needed to make your bakery goods the best possible, as at Omar. Get the facts today from your Gas Company Representative.

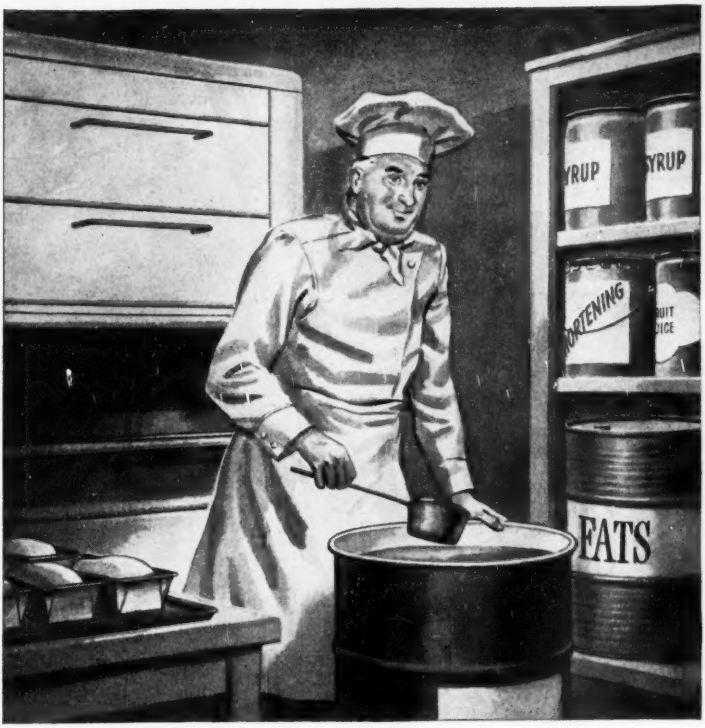
AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, N. Y.

MORE AND MORE... THE TREND IS TO GAS FOR ALL COMMERCIAL COOKING

Let J & L Steel Drums and Pails

help Your Products Sell Themselves

J&L STEEL



Representative samples of J&L's complete line of steel shipping pails showing (top to bottom) the ring seal, closed head and lug covers.

Your quality product and a J&L container are a combination that you can be doubly sure will catch the customer's eye. Besides affording maximum protection against damage or contamination, J&L Steel Drums and Pails offer an opportunity to add measurably to the sales appeal of your product. Our artists are at your disposal to assist you in creating a distinctive, decorative package.

We can provide all types of Closures, Finishes and Decorations

Heavy-duty ICC Drums	Light-gage Drums 55, 30 and 15 gal. capacity and 100-lb. Drums	Lightweight Drums for Chemical and Powdered materials	Steel Pails for Foods, Chemicals Oils—1-10 gal. cap.

Why not write for a free copy of our booklet "It's Safer to Ship in Steel." It will give you important information on J&L Steel Pails and Drums.

J & L STEEL BARREL COMPANY

A Subsidiary of Jones & Laughlin Steel Corporation

CHRYSLER BUILDING
New York 17, New York

PLANTS
Bayonne, N. J. • Cleveland, Ohio • Philadelphia, Pa.
New Orleans, La. • Kansas City, Kan. • Atlanta, Ga.
West Port Arthur, Texas • Toledo, Ohio

J&L Steel Barrel Company
Chrysler Building
New York 17, N.Y.

Please send me a free copy of your booklet, "It's Safer to Ship in Steel."

Name_____

Company_____

Address_____

_____

This Vitafreze Automatic Dipping and Bagging Machine is built mostly of Stainless Steel. It is used by large ice cream plants throughout the country to produce frozen stick confections at 1800 dozen per hour. The manufacturer is Vitafreze Equipment, Inc., Sacramento, California.

Exceptional corrosion resistance makes Stainless Steel the ideal material for this Vitafreze brine tank.

Figure the true cost and you'll figure on Stainless Steel

IN spite of its sometimes slightly higher original cost, there's nothing expensive about Stainless Steel for food processing equipment. Stainless offers you long-run savings from so many angles that you'll usually find it the most economical material you can use.

Take the extensive use of Stainless Steel in this Vitafreze frozen confection equipment: Stainless preserves perfect sanitation . . . won't react with food products such as milk and chocolate . . . thus by avoiding spoilage it helps to keep *material costs* low. Because Stainless is easier to clean . . . *labor costs* are less, too. Durability and corrosion-resistance hold *replacement costs* to a minimum.

Add up all these money-saving benefits and you'll find that the overall cost of Stainless Steel equipment is constantly far lower than that of equipment built from less efficient materials. But to realize the *full* advantage that Stainless offers, you must use the grade, form and finish best suited to the job.

In U·S·S Stainless Steel, fabricators have the assistance of our experienced Stainless Steel engineers who will help them in applying Stainless most efficiently and most economically . . . and thus make certain that you get the finest performance possible from Stainless Steel equipment.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND • COLUMBIA STEEL COMPANY, SAN FRANCISCO
NATIONAL TUBE COMPANY, PITTSBURGH • TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM • UNITED STATES STEEL COMPANY, PITTSBURGH
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

1-181

UNITED STATES STEEL

Vitamin A adds new punch to your sales story!

IF you need some heavy leather to throw into the sales story of your food product, picture this phrase on your label: "*Enriched with Vitamin A*".

And when you turn to vitamin A, you'll naturally want to turn to DPi. For DPi's molecularly distilled vitamin A is taste-free and it's the most stable natural vitamin A concentrate available for use in pharmaceutical or food products. This is a result of DPi's worldwide sources for natural fish liver oils —and a big modern plant for continuous, large-scale refining and molecular distillation.

Yes, if you need more punch in your sales and feel that DPi Vitamin A may be the answer, be sure to call on us. We'll be glad to discuss your problem in detail. Simply write ***Distillation Products Industries,*** 723 Ridge Road West, Rochester 3, N. Y. (Division of Eastman Kodak Company). Sales Offices: 570 Lexington Avenue, New York 22, N. Y. • 919 North Michigan Avenue, Chicago 11, Ill. • Gillies & Loughlin, Los Angeles and San Francisco • Charles Albert Smith, Ltd., Montreal and Toronto.

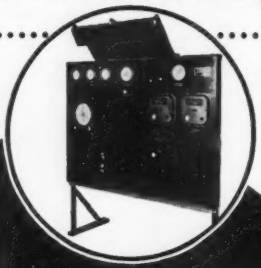
DPi

leaders in research and production of both natural and synthetic vitamin A

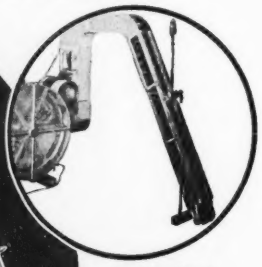
Also . . . high vacuum equipment . . . distilled monoglycerides . . . more than 3400 Eastman Organic Chemicals for science and industry

fmc STERILMATIC® Processing Equipment

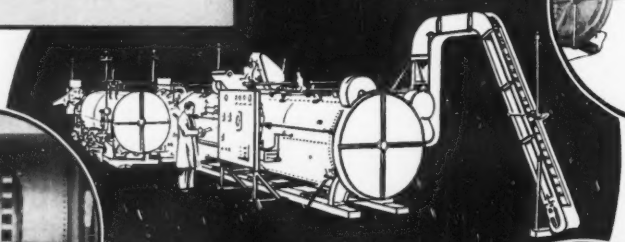
The "One-Man Cook Room" that saves steam - space - time

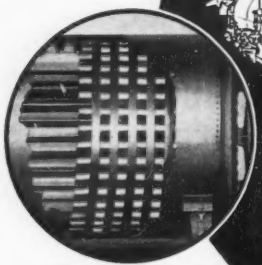


Centralized Control Panel
All control instruments, gauges, and electrical connections arranged and correlated so operator knows at a glance how entire machine is functioning.

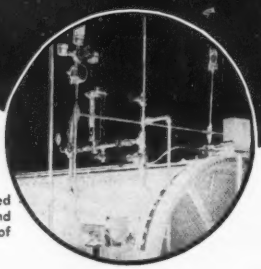


Positive Feed Elevator
Automatically positions cans in feed valve, eliminates can and product damage.

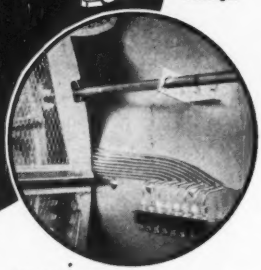




FMC Spiral Reel Design
Advances cans through cooker and cooler while they are in a free-rolling position, resulting in considerable savings in power and reel wear.



Automatic Stops and Signals
Protective stops and light signals located at critical points give instant warning and automatically stop machine in the event of improperly positioned cans, etc.



Banked Lubrication
Grouping of lubrication lines into banked blocks at centralized points eliminates scattered grease fittings, assures complete and proper servicing.

Representing a major advancement in modern sterilizing equipment, the completely efficient FMC Continuous Sterilmatic Processing Line is widely used today in the processing of virtually all types of canned fruits and vegetables. Canners are assured of reduced costs, increased cook room capacity, less cooking time, improved product flavor, better appearance, and a higher quality pack. This "*one-man cook room*," centrally controlled, utilizes automatic protective stops and signals to avoid costly delays and damage to both machine and cans. Rolling agitation of each can results in fast, uniform heat penetration, and losses from over or undercooked batches are avoided. Smooth mechanical progression of cans from cooker elevator to cooler discharge reduces handling, eliminates denting and damage. Steam savings often reach 60% or more through greatly reduced processing time and subsequently lower heat radiation. Further savings in time, manpower and floor space contribute to the remarkable economy of the FMC Sterilmatic Pressure Cooker and Cooler.

Write for full information, or contact your nearest FMC representative.

First in Diversified Food Equipment

fmc FOOD MACHINERY AND CHEMICAL

FOOD MACHINERY AND CHEMICAL CORPORATION
Canning Machinery Divisions

General Sales Offices:

EASTERN: HOOPESTON, ILLINOIS **WESTERN:** SAN JOSE 6, CALIFORNIA

FOR SALE!

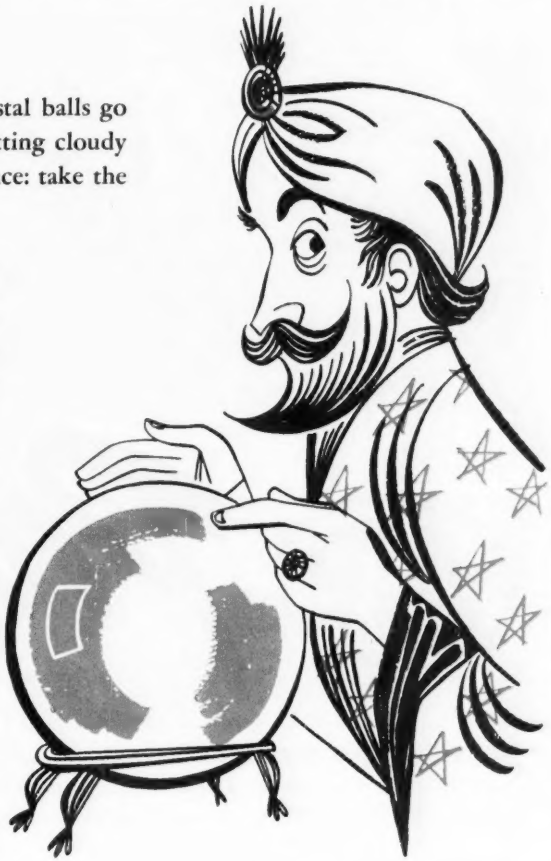
One (slightly used) Crystal Ball

Not a bad crystal ball . . . as crystal balls go . . . but lately it has a habit of getting cloudy when we need it most. For instance: take the case of VISQUEEN* film.

As you probably remember, VISQUEEN film was originally developed for the specific use of the armed forces. What they wanted was a polyethylene film such as had never been seen before . . . strong, durable, chemically inert, flexible and all the other qualities you know so well . . . a film that would meet rigid specifications yet be economical to use. *They got it!* And now, like many another reserve . . . VISQUEEN film is being called back to active service.

And that's our problem. While our Defense requirements get bigger and bigger . . . our customers delivery will of course dwindle. So we searched our crystal ball. And the only thing we could find is that we will have to ask you to please be patient . . . we're working hard, and we'll work harder to make every effort to fill your orders. You may be cut down . . . but we promise we will do the best we can to get VISQUEEN film to you.

*T.M. The Visking Corporation



IMPORTANT!

VISQUEEN film is all polyethylene, but all polyethylene film is not VISQUEEN. VISQUEEN is the only film produced by the process covered by U. S. Patent No. 2461975. Only VISQUEEN film has the benefit of the research and extensive technical experience of The Visking Corporation, pioneers in the development of polyethylene film. Be sure. Always specify VISQUEEN film for superior tear and tensile strength and greater uniformity.

VISQUEEN Film . . . *A Product of*

THE VISKING CORPORATION

PRESTON DIVISION · TERRE HAUTE, INDIANA

In Canada, Visking Limited, Lindsay, Ontario

PROTECTION AND *Beauty*

GAZELLE—A small antelope that races and leaps across the African veldt with almost incredible speed and grace.

RHINOCEROS—A hulking horned brute with the body of a tank, a temper like TNT, and a face like a nightmare.

KVP *Papers* for the FOOD INDUSTRY

When you spend so much time and care in processing quality into your foodstuffs, it's just good common sense to protect it until it reaches consumers' tables. The better you preserve food flavor and wholesomeness, the better your prospects for steady, repeat sales.

KVP Papers, with their almost infinite number of applications, can help keep your products clean and fresh for consumer satisfaction. KVP artists and printers can add sales-stimulating designs that help keep your products selling at a more profitable pace.

INDUSTRIES SERVED

BAKING
Bread — Cracker
Cereal

MEAT
Packing — Locker
Retail

DAIRY
Butter — Cream — Cheese
Ice Cream — Milk

FISH • FRUIT • FROZEN FOODS
POULTRY • SHORTENING • VEGETABLE

Kalamazoo Vegetable Parchment Company

PARCHMENT • MICHIGAN

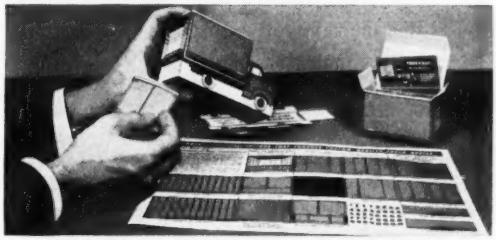
ASSOCIATED COMPANIES:
KALAMAZOO VEGETABLE PARCHMENT CO., DEVON, PENNA.
KVP COMPANY OF TEXAS, HOUSTON, TEXAS
HARVEY PAPER PRODUCTS CO., STURGIS, MICHIGAN

IN CANADA:
THE KVP COMPANY LIMITED, ESPANOLA, ONTARIO
APPLEFORD PAPER PRODUCTS LIMITED,
HAMILTON, ONTARIO • MONTREAL, QUEBEC

FRUEHAUF VAN BODIES are "Job-Fitted" to YOUR BUSINESS...OVER 500 WAYS!

BEFORE you consider any other Truck Body today, you owe it to yourself to investigate these "BIG 5" FRUEHAUF BUYING ADVANTAGES:

1. Over 500 options. 2. All steel, "Unit-Built" construction. 3. Straight-frame or wheelhousing . . . all popular lengths. 4. Fast assembling, mounting and painting service at 80 Branches coast-to-coast. 5. Custom-built quality at production-line prices.



"JOB-FITTED" IN MINIATURE!

Fruehauf Truck Body Model Kit lets you make up your own unit—complete with all options—*before it's built!* A few seconds is all it takes. Ask for your model kit today—*free* to any prospect upon request.

FRUEHAUF
Truck Bodies
"ENGINEERED TRANSPORTATION"

FREE CATALOG AND MODEL KIT!
See your local Truck Dealer or Fruehauf man,
OR WRITE
FRUEHAUF TRAILER COMPANY
BODY DIVISION
10956 HARPER AVE. • DETROIT 32, MICH.

You might ponder a bit about what you see in Soda Fountains

UNLIKE the bemused young man who is ruining his shoeshine, above, we ask you to overlook the social aspects of soda fountains, sandwich shops or lunch counters, etc., and give heed instead to their economics.

The economic angles, for instance, that cause these popular eating places of the short-order, quick-lunch variety to go in so heavily for stainless steel equipment. Notice it for yourself. Practically *everything* behind their counters is made of clean, bright, efficient-looking stainless steel—sometimes even the walls and ceiling.

Why? Because nothing else fills the bill as well and keeps operating costs as low. No other commercially available metal packs the same combination of great strength and resistance to corrosion, heat and wear.

If these properties are important to soda fountains, they are doubly vital to essential industries and to the national welfare in times of stress.

Every user of stainless steel today should aim at using it to the best advantage. ● We're ready to help you, and in addition we're continuing to spend millions of dollars to increase the supply of Allegheny Metal and other alloy products.

* * * * *

Complete technical and fabricating data—engineering help, too—are yours for the asking from Allegheny Ludlum Steel Corporation, Pittsburgh, Pa. . . . the nation's leading producer of stainless steel in all forms. Branch Offices are located in principal cities, coast to coast, and Warehouse Stocks of Allegheny Stainless Steel are carried by all Joseph T. Ryerson & Son, Inc. plants.

WAD 3262

You can make it **BETTER** with

Allegheny Metal

AL
TIME-TESTED STAINLESS STEEL

How to squeeze more profit out of a homogenizer

EACH of the three plungers in this Superhomo Homogenizer, built by the Union Steam Pump Company, Battle Creek, Michigan and sold by Cherry Burrell Corporation, Chicago, Illinois, puts up to 12,000 lbs. of load on the crankshaft bearings. The pinion shaft bearings have to take the loads from the overhung V belt pulley and the pinions. To take these heavy loads, both pinion shaft and crankshaft are mounted on Timken® tapered roller bearings. Timken bearings assure long life and trouble-free performance under the toughest conditions, keep maintenance time and costs to a minimum.

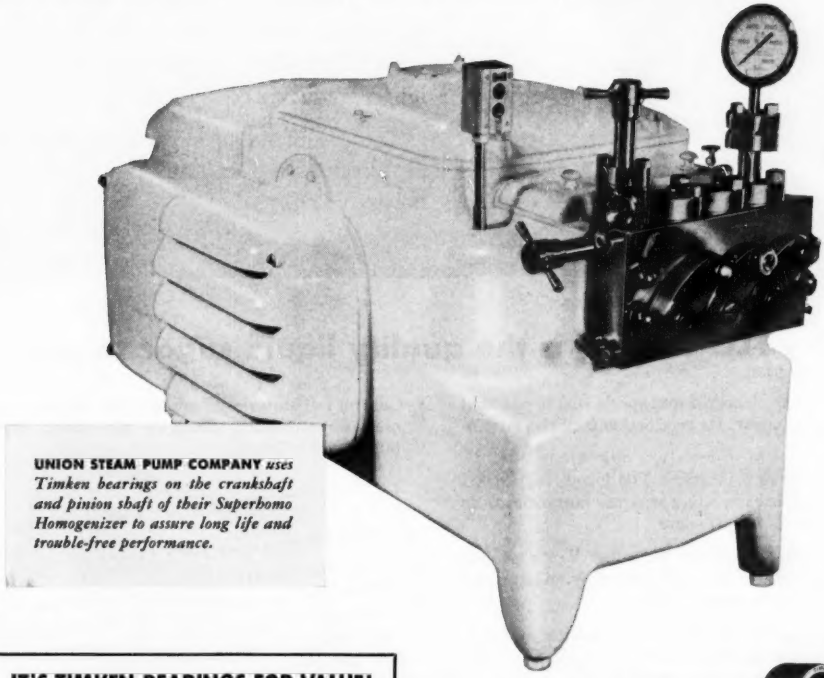
Due to their tapered design, Timken bearings carry both radial and thrust loads in any combination. Shafts are held in positive alignment, with a minimum of end-play and deflection. There's less wear on moving parts and longer machine life results.

Line contact between the roller and races of Timken bearings gives extra load-carrying capacity. And their true rolling motion and smooth surface finish virtually eliminate friction.

Timken bearings permit tighter closures that retain lubricants longer. There's less time and money spent in lubrication and maintenance. And because they're engineered for the job, made of Timken fine alloy steel, and are precision manufactured, Timken bearings normally last the life of the machine.

For dependable, low cost performance and long machine life, insist on Timken bearings in all the equipment you buy or build. Look for the trademark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



UNION STEAM PUMP COMPANY *uses Timken bearings on the crankshaft and pinion shaft of their Superhomo Homogenizer to assure long life and trouble-free performance.*

IT'S TIMKEN BEARINGS FOR VALUE!

To get the best value in bearings you may find this simple formula helpful:

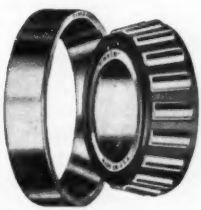
$$Value = \frac{quality + service + public\ acceptance}{price}$$

Obviously a big advantage *above* the line gives you more value than a small one *below*. No other bearing can match the uniform high quality, engineering and field service and overwhelming public acceptance you get with Timken bearings.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST → ◫ ← LOADS OR ANY COMBINATION

USING *Liquid Sugar* IMPROVES CAKE QUALITY!

AS REPORTED in Food Industries, August, 1950, studies by Baking Laboratories show that using sugar in liquid form gives cakes greater quality. The layers have a maximum volume, improved emulsion and an unusual degree of aeration. In addition, less leavening is required.

Flo-Sweet's own research shows, further, that baked goods made with the right liquid sugar stay fresh and salable longer, reducing costly returns.

The use of liquid sugar is a valuable progressive step in cake-making technology.

Why FLO-SWEET® is the quality liquid sugar to use

Flo-Sweet has pioneered and specialized in one field only—liquid sugar. Its production facilities are unsurpassed.

☆ Centrifugal Purification: The latest, high-speed centrifugals completely separate impurities from the crystals in raw sugar.

☆ Improved Defecation: All sugar liquor passing through our refinery is defecated by an improved method for increased purity.

☆ Char Purifications: By both bone-char and vegetable-char treatment. This brings Flo-Sweet Liquid Sugar to the peak of quality.

☆ Control Laboratories: Various plant control laboratories constantly check on the quality and purity of Flo-Sweet.

When you get FLO-SWEET, you get quality backed by 27 years of successful liquid sugar development and production. Therefore, you get more product improvement, more product control and always-dependable sanitation and service.

flo-sweet

Manufactured only by

REFINED SYRUPS & SUGARS, INC.

Yonkers 1, New York

PIONEERS IN LIQUID SUGAR FOR SAVINGS, SANITATION AND SERVICE

New *Carpenter* Slide Chart contains useful data on STAINLESS TUBING and PIPE

DESIRABLE BENDING and COILING RADII for
Carpenter STAINLESS TUBING and PIPE
THE CARPENTER STEEL COMPANY
ALLOY TUBE DIVISION • UNION, NEW JERSEY

To help you conserve Stainless and get best results from the tubing and pipe you use, Carpenter has prepared this handy slide chart. It contains data on economical tube bending radii and coil diameters for light-walled Schedule 5 pipe.

This Carpenter Slide Chart gives you—

Bending radii for Stainless Tubing
(with and without mandrels)

Coil diameters for Stainless Pipe
(Schedules 5, 10 and 40)

Technical data on
- Tensile Strength
- Rockwell Hardness
- Heat Resistance
- Thermal Conductivity, etc.

How to Get Your Copy of the New Carpenter Stainless Tubing Slide Chart

Just drop us a note on your company letterhead, and we will be glad to send you a copy of this useful slide chart. You can use it to conserve critical material by getting best possible results where you use Stainless Tubing or Pipe.

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, N. J.
Export Department, Reading, Pa. "CARSTEELCO"

Carpenter
STAINLESS TUBING

—guaranteed on every shipment

400° F.

350° F.

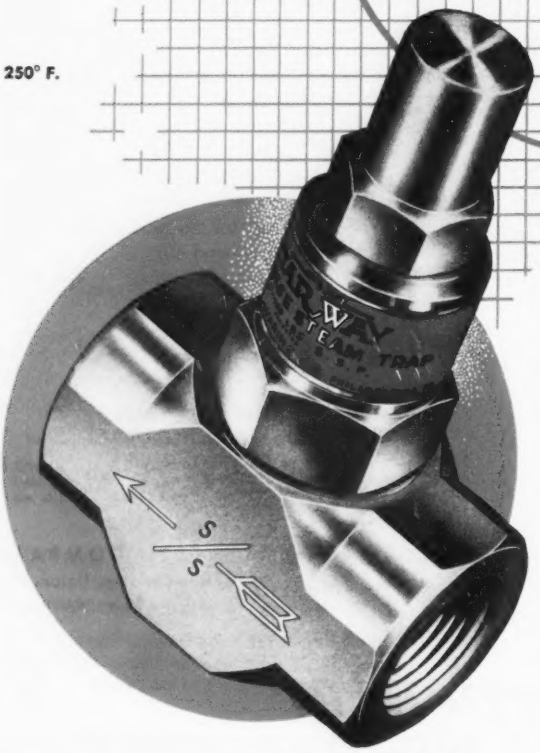
300° F.

250° F.

FOR EVEN TEMPERATURES

YARWAY

STEAM TRAPS



● Processes requiring careful temperature control call for Yarway Impulse Steam Traps on steam equipment.

The reason . . . Yarway traps maintain even temperatures because they *continually* sample and respond to a trickle of the condensate. There is no arrest in flow, no waiting for large quantities of condensate to accumulate, or trapped steam pockets to condense.

Other reasons why Yarway Impulse Traps have become first choice in many thousands of plants:

- **They get equipment hotter, sooner**
- **Small size, light weight**
- **Easy to install, easy to maintain**
- **Only one moving part**
- **Good for all pressures**
- **Stainless steel construction**
- **Low cost**

If you are not already familiar with these and other advantages of the Yarway Impulse Steam Trap, try one *for free* and find out for yourself. Call your nearby Yarway distributor, or write to:

YARNALL-WARING COMPANY

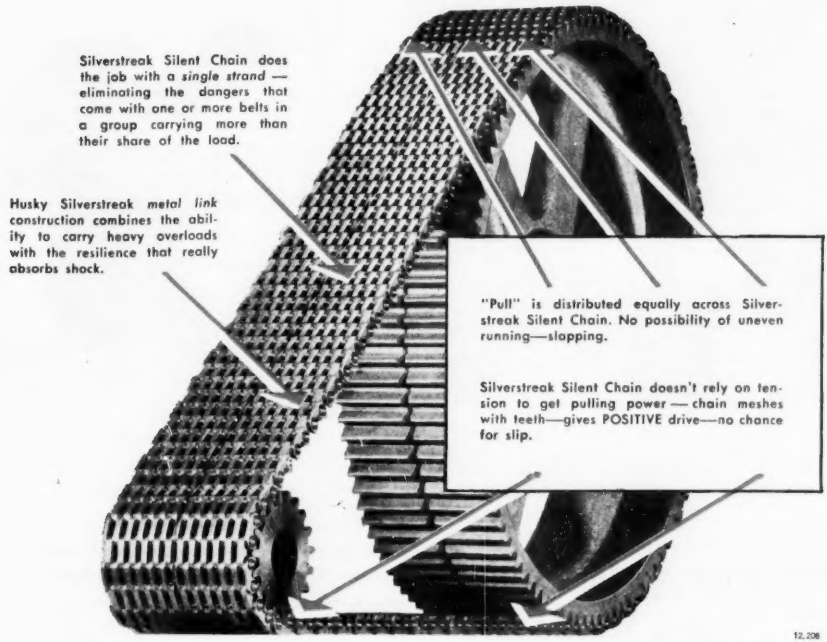
127 Mermaid Avenue • Philadelphia 18, Pa.

BRANCH OFFICES IN PRINCIPAL CITIES

Stainless Steel Body

YARWAY IMPULSE STEAM TRAP

SLIP-PROOF
SLAP-PROOF
SHOCK-PROOF


Silverstreak Silent Chain does the job with a *single strand* — eliminating the dangers that come with one or more belts in a group carrying more than their share of the load.
Husky Silverstreak *metal link* construction combines the ability to carry heavy overloads with the resilience that really absorbs shock.
"Pull" is distributed equally across Silverstreak Silent Chain. No possibility of uneven running—slapping.
Silverstreak Silent Chain doesn't rely on tension to get pulling power — chain meshes with teeth—gives POSITIVE drive—no chance for slip.
12.206

Get Full RPM Transmission With LINK-BELT Silverstreak Silent Chain Drives

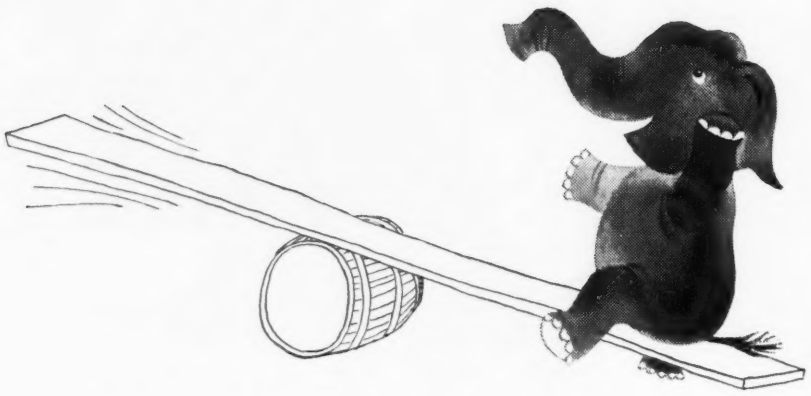
Yes, get the amazing, trouble-free efficiency of 98.2%. A standard of operation that continues throughout the long, long life of the drive. More than this — every rating and design is backed by a record of *proven performance*. And every chain is engineered for the job. You conserve space, too — for Link-Belt Silverstreak Silent Chain Drives operate efficiently on short centers. Ratios as high as 10 to 1 are commonly used.

Little wonder, then, that so many concerns to whom top operation efficiency and rugged dependability are a must, standardize with Link-Belt Silverstreak Silent Chain Drives.

LINK-BELT COMPANY, Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Johannesburg. Offices in principal cities.

LINK-BELT

SILVERSTREAK SILENT CHAIN DRIVES



Give your product a lift with Wyandotte Better Blend Soda!

Use Wyandotte Better Blend Soda as a leavening agent in self-rising flours and baking powders. Use it for effervescence in mineral waters and soft drinks. Use it, too, for preservatives, disinfectants and neutralizers.

Wyandotte Better Blend Soda is made especially for the food industry. It mixes easily and thoroughly, gives you a consistent product. It is non-caking, will not clog machinery. It is pure and uniform.

Why not write for the full facts on this fine product?

Chicago 11, Ill., 435 North Michigan Avenue . . SUperior 7-8866
Cincinnati 2, Ohio, 825 Dixie Terminal Building . . CHerry 4941
Detroit 26, Mich., 1319 Dime Building . . . WOodward 1-1014
New York 17, N. Y., 60 E. 42nd Street . . . MUrray Hill 2-1780
Pittsburgh 22, Pa., 1114 Oliver Building . . . . GRant 1-0640
St. Louis 1, Mo., 1430 Paul Brown Building . . . CHestnut 6373
Los Angeles 12, Cal., 114 West College Street . . CApitol 4212

WYANDOTTE CHEMICALS CORPORATION
Wyandotte, Michigan • *Offices in Principal Cities*

Wyandotte
REG. U. S. PAT. OFF.

Recipe for hard-boiled meat-plant operators

Do what SCHAAF SAUSAGE CO. did...

Specify WEAR-EVER

Here's an interesting before-and-after case history. Schaaf Sausage Co. of Milwaukee was using a tank with live-steam injection for cooking. The results were unsatisfactory—with uneven cooking, excess water, and thin, watery broths.

Schaaf converted to Wear-Ever Aluminum Steam-Jacketed Kettles and found them perfect, as compared with their old method of cooking. Schaaf is now using Wear-Ever Kettles for cooking (1) veal and chicken for chicken loaf (2) beef for corn beef loaf (3) beef with seasoning for roast beef loaf (4) tongues for tongue sausage (5) snouts, skin, and tongues for head cheese (6) and all meats for stuffing various sausages.

Schaaf had a problem. Wear-Ever solved it!

Look at the facts yourself. See what you get when you specify Wear-Ever Kettles—

1 More evenly processed meats.
2 Quick, uniform heat.
3 Increased production per hour per kettle.
4 Ability to use an economical, low-pressure steam system.
5 Super-tough aluminum alloy that gives many years of heavy-duty service—at lowered maintenance costs.
6 Space-saving design.
7 A wide range of styles and sizes to select from.

For information about Wear-Ever Aluminum Steam-Jacketed Kettles write: The Aluminum Cooking Utensil Co., 303 Wear-Ever Building, New Kensington, Pa.

WEAR-EVER Aluminum

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT. OFF.

Standard of Quality for more than 50 years

The Aluminum Cooking Utensil Company
303 Wear-Ever Building, New Kensington, Pa.

Please send us complete details and specifications on your Steam-Jacketed Kettles for food plant use.

Name .....

Firm .....

Address .....

City ..... *State* .....

MAIL TODAY

You don't use old-fashioned, hand-filling methods

when you can use

AUTOMATIC HIGH SPEED PACKAGING...

Why use **Old-Fashioned** Spice-Flavoring Methods when you can use

MM&R SPICE OILS the MODERN Method of FLAVOR CONTROL

RANKING HIGH among the *important* food packing improvements of the past decade is the development of *modern flavor* control through the use of Spice Essential Oils. Progressive food packers have been quick to see the many advantages . . . both *quality-wise* and *economy-wise* . . . in the use of uniform, 100% pure Spice Essential Oils that have not been diluted with wetting agents.

A glance at the panel to the right will reveal immediately the reasons why more and more manufacturers are switching to Spice Essential Oils . . . the MM&R brand . . . pace-setter in the field of Spice Oils for the food industry.

11 Reasons Why You Should Use MM&R SPICE ESSENTIAL OILS

1. Uniformity of quality and flavoring
2. No color disturbance
3. Less bulk in storage
4. Less weight in shipping
5. No danger of molding
6. No loss by exposure in package while being stored
7. Free from bacteria
8. Ease of handling
9. Less cost as compared to equivalent spice value
10. Entire flavor available immediately
11. Elimination of the possibility of dust and dirt

Send for complete information and "Table of Equivalents" showing comparative flavoring strengths of whole spices and spice oils

MAGNUS, MABEE & REYNARD, INC.

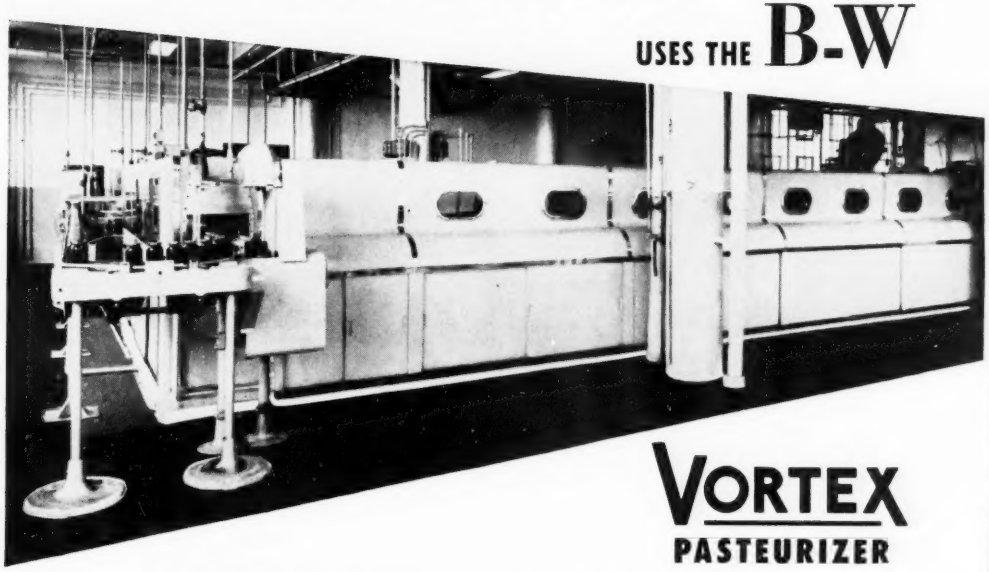
SINCE 1895 . . . ONE OF THE WORLD'S GREATEST SUPPLIERS OF ESSENTIAL OILS

16 DESBROSSES STREET, NEW YORK 13, N.Y. • 221 NORTH LASALLE STREET, CHICAGO 1, ILL.

LOS ANGELES: BRAUN CORP. • SEATTLE, PORTLAND, SPOKANE: VAN WATERS AND ROGERS, INC. • SAN FRANCISCO: BRAUN-KNECHT-HEIMANN CO.

CROSSE & BLACKWELL

USES THE B-W



VORTEX PASTEURIZER

- **FOR MORE EFFICIENT PRODUCTION**
- **TO PROTECT A QUALITY PRODUCT**

Like many other leading food processors, Crosse & Blackwell, Baltimore, Md., has found the famous Barry-Wehmiller "Vortex" Pasteurizer to be a valuable aid to better, more economical production and a protector of the uniformity of a fine product. Illustrated above is a "Vortex" used to pasteurize preserves in the Crosse & Blackwell plant.

The operation of the "Vortex" is entirely automatic and it is run continuously without operators. Positive accurate control of temperatures is maintained at all times and speeds can be varied to suit the processing time.

Heat transfer is achieved by the Barry-Wehmiller system of atomized water sprays. Jars or containers are moved through the machine by the patented "walking-beam" conveyor system. Because the conveyor at any point remains at the same temperature as the heat exchange medium nearest to it, it eliminates the usual cost of heating and reheating conveyors that pass in and out of process zones.

The entire machine is unusually rugged and durable, highly efficient and saves time and space. Glass breakage is negligible. Hydraulic drive provides unusual accuracy of process time, uses less power.

"Vortex" pasteurizers, freezers, coolers and exhaust boxes have a wide variety of applications in the food field. Write today for full information on the "Vortex" model that will cut costs and aid production in *your* plant.

KNOWN THE WORLD OVER

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244

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the truth
about how
CHICKEN
SPAGHETTI
BAKED BEANS

menus are born!

. . . not romance, but realism . . . about the way meals are planned and menus are born in these days of self-service.

According to the books, meal planning is a thoughtful process, studiously carried out in the quiet of the home. Menu-building, under this pretty theory, is the product of long and careful consideration, culminating in a complete shopping list. The final buying action, when it comes, is supposed to be just a routine action.

The reality is quite a different matter, however, in these days of super-markets and self-service!

Actually, menu-making nowadays is much more likely to be *an on-the-spot job*—and *the spot* is the self-service store.

Millions of times each day, meals are conceived under the power of suggestion exercised by those inspiring arrays of food on the self-service shelves. A suggestion is flashed by *a compelling package . . . a train of thought is started . . . and a quick scanning of the shelves then completes the process of "thinking up" a menu.*

Isn't that the way it really happens, most of the time?

Especially in self-service selling

In the light of this realistic analysis, the power of glass packaging in self-service stores becomes obvious.

For a food packer to cash in on those menu-inspiring impulses, there's no better way than *to let his product do its own suggesting.* No words, no label, no printed picture of food can ever spark these sudden buying impulses as effectively as the food itself!

Much of the success of modern self-service selling, then, must be credited to the packaging formula which reads *Glass + Vapor-Vacuum* . . . the packaging formula now used for most of *the best sellers* in the field of food.

Foods in *Glass + Vapor-Vacuum* are the very finest impulse-stimulators in the whole realm of self-service. Nothing else can act so easily, so smoothly, to move one more item into the shopper's cart . . . or to inspire an entire menu.

* * *

Among the billions of *Glass + Vapor-Vacuum* packed items that move from America's self-service shelves each year, a very large proportion *are moved by impulses created after the shopper enters the store.* Take these impulses away and self-service stores just couldn't be as successful as they are today!

What better proof that *"Glass + Vapor-Vacuum is a foundation stone in the self-service structure!"*

WHITE CAP CO., 1819 North Major Avenue, Chicago 39, Illinois.

It's no coincidence that one of the greatest of all self-service items—catsup—is almost universally Vapor-Vacuum Sealed. Top catsup packers know what it takes to sell their wares via self-service! These packers are practically unanimous in choosing Vapor-Vacuum closures.

"VAPOR-VACUUM"
Seal and Re-Seal

This Steel-Service Team for Food Industry Requirements

Convenient to food industry operations from coast to coast, thirteen Ryerson steel-service plants stand ready to supply the food industry and its equipment builders.

True, shortages resulting from the twin pressures of defense requirements and unprecedented civilian demand may make it impossible for us to furnish every item on every order, much as we would like to. But it *is* likely that most of your requirements are among the stainless carbon and alloy steels we have on hand for prompt shipment. And experienced Ryerson steel men are always glad to work with you —help you make the most of available steel.

From switchboard to shipping floor all of us are ready to give you prompt service whenever humanly possible. So call us for every steel need.

PRINCIPAL PRODUCTS

CARBON STEEL BARS—Hot rolled and cold finished.
STRUCTURALS — Channels, angles, beams, etc.
PLATES—Many types including Inland 4-Way Safety Plate.
SHEETS—Hot and cold rolled, many types and coatings.
TUBING—Seamless and welded, mechanical and boiler tubes.
ALLOYS—Hot rolled, cold finished, heat treated.
STAINLESS — Allegheny bars, plates, sheets, tubes, etc.
REINFORCING—Bars and accessories, spirals, wire mesh.
BABBITT — Glyco bearing metal, also Ryertex plastic bearings.
MACHINERY & TOOLS—For metal fabrication.

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MARCH, 1951

Food Industries

Quick Action Needed on Materials Requirements

Between now and mid-year, the food processing industry's future rests importantly in the hands of a government agency. It is the agency responsible for claiming the amounts of scarce materials necessary to keep food processing plants operating at proper capacity, and to permit the growth and modernization necessary to maintain this vital industry in a strong position.

By mid-year, a Controlled Materials Plan is expected to go into effect. This plan will allocate the supply of materials for civilian uses among the many claimants.

Unless somebody speaks up forcefully for the food processing industry—and backs up claims with data on requirements—the industry may well get the short end of the stick.

The official spokesman will be the Office of Materials & Facilities, Production & Marketing Administration, U. S. Department of Agriculture, Washington, D. C. OM&F is headed by L. B. Taylor, a man who has a reputation for ability. But Mr. Taylor has a big job to do before his organization can effectively represent the interests of food processors.

He has a plan at this stage. It is to set up a coordinating agency in the Office of Materials & Facilities, then draw upon the commodity branches of PMA for information on the materials requirements of various branches of the food field.

It is encouraging to know that there is such a plan. Up to now there has been no Washington agency to look after the needs of food processors. Nor has there been any formal procedure for helping a processor.

But it will be surprising if a couple of unfortunate situations do not develop under the proposed setup. First, the commodity branches will be more interested in giving farmers what they want than they will in taking care of processors. Second, there will be strong rivalry between the commodity branches and a tendency to "get theirs" at the expense of others.

If the plan is to work even reasonably well, some strong individuals who are well grounded in food processing operations and problems must be placed in key positions in the PMA setup. Such men are urgently needed not only in OM&F, but in the various PMA commodity branches. We know of one such individual who has been asked to go to Washington, and we hope and pray there will be many more like him.

Time also is very much of the essence. With a Controlled Materials Plan due at mid-year, OM&F hasn't much time to set up the proper organization and to prepare its bill of scarce materials requirements.

Obviously, it is up to food equipment manufacturers to go to bat on this problem. But it is just as important for food processors and industry associations to take a hand. They not only should go all out in helping OM&F, but should take the initiative in supplying that agency with realistic facts and figures.

The defense program is a long-haul proposition. And the vital food processing field cannot continue to advance as an industry—nor even hold its own—in a three to five year drag unless it gets at least a normal amount of materials for plant and equipment.

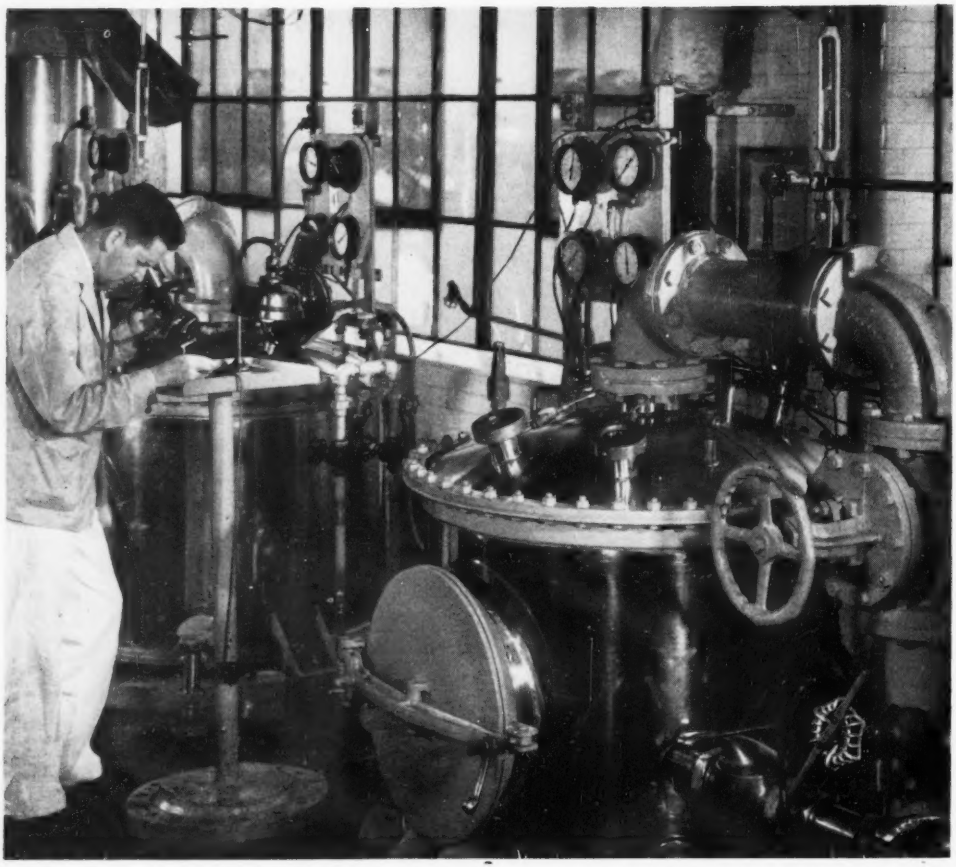
In recent years, the food industry has spent nearly $600,000,000 annually for new plant and equipment. This expenditure involves sizable tonnages of steel, stainless steel, copper and aluminum. And when you compare the above figure with the $820,000,000 spent for new plant and equipment in 1947—when the industry was catching up after World War II—you see that the lower figure is a peacetime norm.

The industry has two things in its favor. PMA believes that the country's food production and food processing capacities should be maintained at a high level, to meet future emergencies. And the industry is classed among the essential ones which have first call on scarce materials after the military gets what it needs.

But a favorable attitude on the part of government agencies is not enough. Food processors and food machinery manufacturers better make their needs known in Washington—and quickly.

—F. K. LAWLER, *Editor*

No Delay—Tests Made Right on Line



BY TAKING refractometer direct to kettles, operator is within reach of shut-off valves when end-point is determined.

Preventive Quality Control

It Spots Sub-Standard Products In Time to Act

Trick, however, is to hit on happy-medium system—between one too costly and elaborate and one over-simplified, thus ineffective. It can be done with minimum of equipment, practical timing, and vigilance by personnel—as C. & B. shows here

B. W. CLARKE
Chief Chemist, Crosse & Blackwell, Baltimore, Md.

There has been a tendency, in recently published articles and discussions of quality control, to concentrate on detailed instruction for inspection of finished products.

In the recommended procedures, time-consuming and often complicated chemical and physical tests are applied, or elaborately organized taste panels are employed.

We will agree that such inspections and analyses, suitably modified, are essential in providing a check on what has been done, and in serving as a guide for the future.

But in our opinion they do not constitute real quality control.

For, it must be kept in mind that, even with fairly moderate rates of production, a number of packages will be filled before a representative sample can reach the laboratory and be subjected to the simplest form of physical and chemical examination. And by the time the laboratory examination is made, it is often too late to do anything about changing the product anyhow.

Therefore, it seems reasonable that if quality control is to be effective it must largely function on the production lines and in the processing operations.

Our aim at Crosse & Blackwell is to build quality *into* the product by maintaining, as far as is practicable, quality control of materials, processes, and equipment. We prefer to place the emphasis on "preventive" and "therapeutic" practices rather than on diagnostic or post mortem examinations.

For a surprisingly large number of products, as a matter of fact, a good quality control system can be operated with very simple laboratory equipment—such as a burette, refractometer, gram or ounce scales, vacuum gage, and thermometer.

In any event, however, it must always be recognized that no amount of laboratory work will compensate for lack of vigilance and alertness on the part of personnel in the manufacturing operation, or will it substitute for their common sense and experience in the interpretation or application of laboratory results.

In truth, the matter of personnel—and personalities—does not always receive the attention it deserves. This does not mean personnel of the quality control department alone, or even the supervisory force in the manufacturing departments, but involves *all* employees in the factory. For, when thousands of packages of various products are produced every hour of the day, considerable reliance must be placed on the skill, alertness, and enthusiasm of the operators of individual pieces of equipment, or the packers and inspectors of each individual package.

Crosse & Blackwell Has Special Problem

Our own quality control problems are quite different from those of the canner of seasonal products, or the packer of a large volume of a limited number of items.

For example, we normally have one packaging line operating on some type of preserve or jelly, another on canned fruit cake, nut bread, or pudding, another on some form of pickle or relish product, another on cream soup or other canned specialty product, another on seasonal products such as mincemeat, hard sauce, or jellied soups, and still another on sundry items such as condimental sauces or specialties.

"Our aim is to build quality *into* the product by maintaining, as far as practicable, quality control of materials, processes, and equipment. We prefer to place the emphasis on 'preventive' and 'therapeutic' rather than on diagnostic or post mortem examinations."

Packing of tomato juice, catsup and chili sauce, during the season for these commodities, must be integrated with the other operations. And tomato products in themselves offer many quality control problems.

Preliminary processing operations, such as candying peel for mincemeat, sweetening pickles for packing, and preparing fruit juices for jelly, are performed daily. Also

Control "Right Off the Truck"

QC department aids Purchasing by assuring satisfactory materials and segregating undesirable lots.

example: There are some steps in the preserve process where definite quality control standards must be obtained, e.g., proportion of 45 fruit to 55 sugar, minimum 68 percent soluble solids in the finished product, correct proportion of pectin and/or acidifying ingredient to obtain desired consistency, and correct heat treatment to maintain keeping properties.

However, in our strawberry preserves, we aim to maintain the fruit in as whole a condition as possible and to develop the characteristic strawberry preserve flavor and color. Even with a vacuum preserving kettle, we cannot specify exactly how this operation is to be carried out, for the texture and other characteristics of the berries may vary with each batch. Considerable skill and judgment must, therefore, be exercised by the supervisor in the department in the selection of temperature and rate of cooking. The operator must also exercise skill and judgment to carry out this procedure correctly.

Quality control can help by functioning as an inspection system, for with experience, unsuitable lots of fruit can be rejected. Also, inspection of the finished product can indicate ways of improving the different type fruit operations of the manufacturing department.

Fill Checked By Inspectors

Another important QC function which may be of appreciable economic importance is the control of fill of container. This seems to be a problem that has not received the attention warranted. Perhaps this is because, with many canned goods, it is accepted practice to fill the can as full as possible in order to minimize undesirable changes in flavor or appearance on storage. With other canned products, this full-filling is combined with a minimum drained weight requirement.

Many of our products, however, are sold by weight rather than by can or glass size, and thus it is desirable to fill all containers as close to this declared weight as possible. Since most filling machines operate on the volume principle, this makes control of filling more complicated than might be expected. Therefore, we maintain inspectors in each department who check the net weight of fill per package on random samples continuously during the day. This procedure is supplemented by periodic checks by quality control inspectors in the laboratory.

We must confess that we have not succeeded in evolving any statistical basis for the number of samples to be taken at any period, or frequency of sampling periods, in order to obtain the statistical control featured in some discussions of quality control operations.

Examination of the finished product is, of course, an important part of any quality control system, although in our organization it is more in the nature of inspection than control. We have set up a procedure in which every lot of every product must receive the approval of a responsible member of the quality control staff before going to the shipping warehouse.

Whenever possible, this approval is given before labeling. Before a lot is released, we make sure that all our routine checks have been made according to plan, and required chemical and physical standards have been attained, and also that the prescribed heat treatment has been given where this is an essential feature.

In the case of continuous operations such as tomato juice canning, or for "hand pack" items such as pickle products, the production of each hour or two hours is considered a "lot" for quality control purposes. With other products, a batch system is used for the designation of different lots.

Taste Is All-Important

We believe the most important quality with our products is flavor. It is well known that flavor is difficult to measure or record, and some quality control inspection procedures try to avoid its evaluation because no objective tests are available. Some systems involve elaborately organized taste panels, with a long process for selection of panel members, and a complicated procedure for classifying the variation of any given sample from the standard, or for rating the acceptability of a series of various samples.

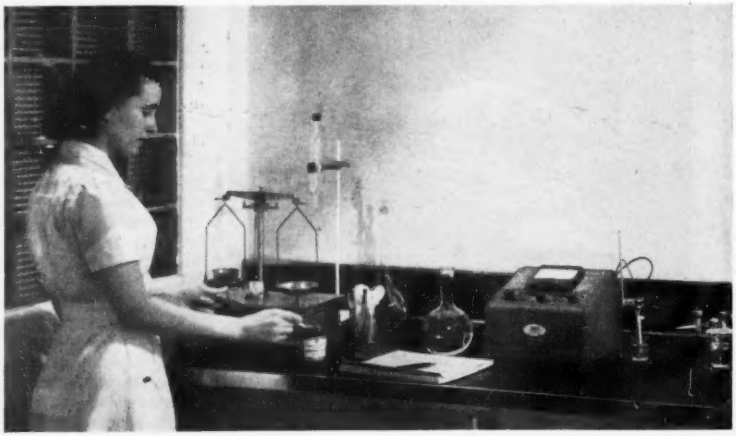
These taste panels undoubtedly have their place in research or development work, or consumer-preference surveys. However, we believe they are not practicable in the actual day-to-day quality control of food products. Nevertheless, as long as the consumer is interested in the flavor of our products, and has become accustomed to that elusive entity known as a "good flavor", we must accept the responsibility for maintaining, as far as possible, the flavor standard expected. This means we must be willing to accept the responsibility for deciding if a given shipment of fruit or vegetables, or even spices, will give us the flavor that we want, after subjection to our various operations and procedures.

Flavor Evaluation Requires Training

We have the further responsibility of insuring that each lot of the final product measures up, as far as is practicable, to the standard of flavor we have set up for that particular product. This requires experience, education, and training,

Lab-Line Tie-In →

CONTROL TESTING STATION. An example of how C. & B. ties laboratory to product. Technician receives samples through window (extreme right), then performs rapid tests and enters results on control form (beside glass of jelly). Carefully recorded on such forms are: Lot, mix or batch number, time received, net weight, drained weight, volume, vacuum, head space, pH, acid, salt, invert sugar, refractometer reading, viscosity, appearance, color and flavor.



as well as a reasonably discriminating palate. When tasting a product which is in the process of manufacturing, or is freshly canned or bottled, we must make allowances for the changes which will inevitably occur on further processing or storage.

Frequently, a decision as to acceptability of flavor must be made in a few minutes. With tomatoes, despite the best efforts of all concerned, weather conditions at times result in the delivery of products of border-line acceptability. We must decide immediately after preparing some tomato juice whether we have satisfactory quality, or if the tomatoes should be diverted to some other less exacting, but possibly less profitable, use.

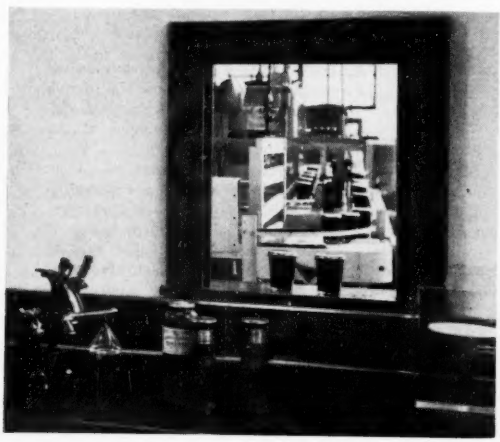
Fortunately, most food technologists can train themselves to recognize variations from normal in flavor of the products for which they are responsible. And we find that, by tasting "experimental lots" with known variations in certain components, we can select individuals whose judgment as to flavor can be relied on. We find some people who can recognize certain types of flavor variations with greater certainty than others. In any taste decision we utilize this ability.

Visual Inspection Essential, Too

We realize that this lot-approval system is based on the testing and inspection of a limited sample. With nonhomogeneous products like strawberry preserves, or with any hand packed item such as pickles, or with a continuous flow such as tomato juice, there is inevitably a variation in appearance and other quality factors from jar to jar or can to can. There is also the possibility that there may be present blemished fruit, or other extraneous material which it is desirable to remove. As far as the ultimate consumer is concerned, each individual jar or can is a sample. Thus it is important that each package should be inspected as closely as possible.

We have found that this type of inspection, which is mostly visual, operates more effectively if it is made the responsibility of the manufacturing department. The function of the quality control organization in this respect is to set the standards to be attained in cooperation with the department inspectors, and to make sufficient periodic inspections during the day's run to insure proceeding according to plan.

This problem of individual inspection is also extended to the closures or seals of the packages as far as practicable. From the quality control angle, our job is certainly not done until the container leaves the factory in good condition. Although can-closing machines are very efficient, they can get out of adjustment occasionally without much warning. We have trained mechanics responsible for the operation of closing machines. They check the can seams regularly during the day.



A lot of cans can, however, pass through between these checks when a line is producing 200 per minute. Fortunately, an experienced worker can usually detect, by visual inspection, any serious difficulty with the sealing mechanism, and we utilize this ability to a maximum degree in our control system.

With products packed in wide mouth glass containers, leakers are detected by "tapping out" at the time of labeling. The variation in "ring" between a high vacuum and low vacuum is quite easy to detect, and surprisingly sensitive. There are occasions when this test is not entirely effective, since there can be minute checks or cracks in the sealing surface which will develop leakage on storage. Normally, this is a very small percentage—a risk we must take with all hot-filled or heat-treated glass packed products, especially if the package used is "unstandardized" or of novel design.

■ "We have set up a procedure in which every lot of every product must receive the approval of a responsible member of the quality control staff before going to the shipping warehouse."

All these inspections should take place before the product is labeled. Quality control must also make sure that the labeling and casing operations are carried out properly and that the correct adhesives and glues are selected and properly applied. It is also necessary to be sure that only clean as well as "sound" containers are labeled, and that the container and label are still clean at the time of packing into the cartons or cases.

Again, this is all largely a matter of alertness and interest on the part of the people operating the labeling machines or inspecting packages, and the supervisors of the department concerned. Periodic and systematic inspection, by the quality control department, of finished goods in the warehouse is also essential.

Automatic Processing Double-Checked

A consideration of containers brings us to the question of control of processing of products and packages. Our procedure is to decide, by means of experiment and consultation with appropriate authorities before production of any line is commenced, what process time is necessary for our various canned specialty items and for our various glass packed pasteurized products.

With most of our canned specialties, the variety of products and container sizes does not justify continuous cookers, hence processing is carried out in vertical retorts. In the case of tomato juice, however, a continuous flash pre-sterilization process is used. Even though the retorts and the tomato juice sterilizing system have impressive arrays of automatic steam, temperature, and pressure controls, it is important to have well trained, experienced operators, in each department, who will be alert to any abnormal variations in the operations or in the curves on the charts.

The quality control staff checks the processing records before any lot is released to the warehouse. This, however, is usually a matter of routine and information since any deviation from standard is usually called to the attention of the quality control staff so that proper adjustment can be made immediately.

In packing preserves we use a continuous spray pasteurizer and cooler. The operator must be continuously on the alert to make sure that all the temperature zones are

(*Turn to page* 209)

Which is their best supplement?

TO GET top quality bread, introduction of supplement in dough is of prime importance. But which supplement —malted wheat flour, bacterial, or fungal—will give best performance? This question is targeted in this article.

FUNGAL ENZYMES Help You Make Better Bread

Part I

Greater loaf volume, improved crumb characteristics are rewards, since these new supplements enable control of enzymic activity and dough consistency

JOHN A. JOHNSON and BYRON S. MILLER

Associate Professors, Department of Milling Industry, Kansas State College. Latter is also Associate Chemist, Bureau of Plant Industry, Soils, & Agriculture Engineering, USDA, Manhattan, Kan.

New standards of identity for bread[1], proposed by the Federal Security Agency, provide that enzyme preparations from the fungus, *Aspergillus oryzae*, may now be added to doughs. This provision is a departure from federal food regulations which permitted addition of only such supplements as barley and wheat malts, malt syrup, and dried syrup made from malted barley or wheat.

Addition of small quantities of these malt supplements has long been recognized in both the U. S. and Europe, as an advantageous practice, since these supplements contain active organic catalysts, enzymes, which convert starches into dextrins and sugars and change certain linkages in the gluten structure. These changes are desirable, in that the sugars make possible a more vigorous fermentation, and modifications of large starch and protein molecules result in improved loaf characteristics in the baked product.

At present, nearly all flour in the U. S. is supplemented at the mill. Only minor additional supplementation is made in the bakeshop. Decision to permit addition of *Aspergillus oryzae* enzyme preparations to the dough was made only after extensive favorable evidence was presented at the bread standards hearings.

However, the addition of these preparations to flour is not permitted at the mill. Introduction of enzymes—other than those present in barley or wheat malt—to flour at the mill requires a change in the flour standards.

Incorporation of fungal-enzyme supplements to dough is not difficult. The supplements can be prepared, by several methods, for convenient use in the bakery:

■ **They may be added to the sponge in a dry, powdered, concentrated form—much as yeast foods are now added.**

■ **They may be introduced in the form of tablets dissolved in water, such as present vitamin supplementation.**

■ **They may also be incorporated in a less concentrated form with an inert diluent such as starch.**

Their addition to flour is also easy. If, and when, supplementation of flour at the mill is permitted by the Federal Security Agency, it should be possible to use present vitamin-supplementation equipment to add the fungal-enzyme concentrates. If desired, the enzyme preparation can be diluted and added in the same way that malted wheat flour is now added.

Fungal Supplements Not Costly

Cost of adding these supplements should not be prohibitive. Although it is still impossible to determine the price of the fungal-enzyme concentrates, present estimates indicate that the cost should be no more—perhaps somewhat less—than that of the supplements now commonly used.

The significance of this supplementation in the dough is indicated by the function of the starch-liquefying enzyme alpha-amylase and the protein-splitting enzyme proteinase. Their use is an advantage over employment of malted barley or malted wheat flour in that the ratio of the two enzyme systems in the malted flours cannot be conveniently varied.

In the case of the fungal enzymes, available information dealing with the differential production and inactivation of amylase and proteinase in fungal-enzyme preparations enables the manufacturer to control and adjust both the amylolytic and proteolytic activity to any desired level. They also make possible utilization of wheats heretofore considered inferior for milling into flour for bread-making purposes.

Enzyme Systems in Supplementation

In addition to alpha-amylase and proteinase, beta-amylase is also involved in the supplementation problem. The latter is present in excess in normal flour, and it stimulates partial break-down of starch molecules by removal of maltose from the non-reducing end of the chain. Maltose is then utilized by yeast during fermentation.

Germinated cereals, as well as certain fungal, bacterial, and animal-enzyme preparations, contain large amounts of alpha-amylase. The degradation of large complex starch molecules and of the dextrin residue remaining after beta-amylase ceases to function, is stimulated by alpha-amylase. And the viscosity of a starch paste is markedly reduced as a result of splitting of the internal linkages of the starch molecule. Alpha-amylase is commonly referred to as the starch liquefying and dextrinizing enzyme. There have been excellent reviews of the literature on the action of amylases in breadmaking.[2,3]

Proteolytic enzymes usually accompany the amylolytic types in malt supplements. The proteinases are of prime importance in baking, since they alter the physical properties of the dough more or less markedly, depending on the extent and type of reaction on the gluten. While proteolysis and the action of certain chemical reducing agents produce similar softening effects in doughs, they have quite different effects on the gluten proteins. The striking difference is that the action of reducing agents is reversible, while this is not the case with proteinase enzymes. Further discussion on the action of proteinase in bread dough is available[4].

Alpha-Amylase Measurement

There are four methods of measuring amylase activity in dough: Determination of maltose value, gassing power, amylograph viscosity, and dextrinogenic activity.

Maltose value is a measure of the amount of this sugar in 10g. of flour after a 1-hr. digestion at 86 deg. F. Gassing power is a gage of the amount of CO_2 released as a result of the action of yeast on the maltose produced during fermentation of a small quantity of bread dough.

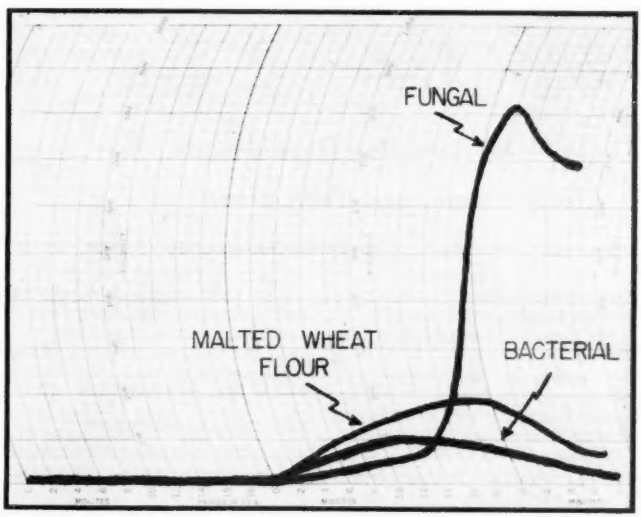
Both maltose value and gassing power indicate the combined activity of alpha- and beta-amylase. Although an excess of beta-amylase is present in flour, its action is greatly enhanced by the presence of a small amount of alpha-amylase. The values are affected not only by the quantity of the alpha-amylase present, but also by the susceptibility of the ungelatinized starch substrate to enzymic attack. The susceptibility is related to the rupture of the starch granules in the milling process. This becomes the limiting factor governing the maltose and gassing power values.

Although both methods have been extensively used for the control of malt supplementation, these data now have less practical significance than formerly, because of the current tendency to employ high sugar formulas.

Rapid starch degradation by alpha-amylase at elevated temperatures permits use of viscometric methods for measuring the enzymic hydrolysis of starch. The principle of the determination depends upon the rapid decrease in viscosity of gelatinized flour-water suspensions in the presence of alpha-amylase.

Selman and Sumner[5] contend that amylograph results are more valuable than either maltose or gassing power determinations. They claim that results of starch liquefaction are more comparable with the actual baking process. Maximum viscosity, however, is affected by starch concentration,

Viscosity Values of Supplements Compared



HIGHEST viscosity value is attained on amylograph curve by doughs made with fungal-amylase supplemented flour. All supplemented flours tested were adjusted to the same gassing value. Data are from Johnson, Dirks, and Shellenberger (see Tables III, IV, and V).

TABLE I—INFLUENCE of Alpha-Amylase Concentration and Source Upon Maximum Viscosity of Gelatinized Flour Paste and Gassing Power of Doughs*

Relative Alpha-Amylase Concentration	Maximum Viscosity (B. U.)	Sixth Hour Gassing Power (mm. of Hg.)
Control	1000	343
Malted wheat flour alpha-amylase		
1X**	450	489
12X	120	710
24X	50	696
Fungal (Aspergillus oryzae) alpha-amylase		
1X	880	596
12X	726	687
24X	550	724

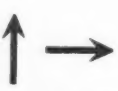
* Johnson, John A., and Miller, Byron S. "High Levels of Alpha-Amylase in Baking. I Evaluation of the Effects of Alpha-Amylase From Various Sources." *Cereal Chem.*, 25, 168–178, 1948.

** Normal concentration of alpha-amylase equivalent to that provided by 0.250*g.* of malted wheat flour per 100*g.* of flour.

TABLE II—EFFECT of Temperature Upon the Inactivation of Alpha-Amylase From Various Sources*

Temperature (Deg. F.)	Malted Wheat Flour Alpha-Amylase Activity Remaining (Percent)	Fungal Alpha-Amylase Activity Remaining (Percent)	Bacterial Alpha-Amylase Activity (Percent)
140	100.0	100.0	100
149	97.9	100.0	100
158	91.0	63.0	.87
167	29.1	6.3	76
176	14.5	0.0	39

* Data of Johnson and Miller (ref. Table I).



These Data Show How Supplements Affect Dough, and Then Bread

TABLE III—HOW Maximum Viscosity and Maltose Value Are Affected by Adjusting Flour With Various Alpha-Amylase Sources to Same Gassing Power*

Supplement Type	Supplement Amount (mg./100g. Flour)	Gassing Power Six-Hour (mm. of Hg)	Maximum Viscosity (B. U.)	Maltose Value (mg./10g. Flour)
Malted wheat flour	250.0	484	180	226
Fungal	6.3	479	820	171
Bacterial	63.2	480	100	347

* Johnson, John A., Dirks, B. M., and Shellenberger, J. A. "Evaluation of Amylase Supplements for Bread-Making Purposes." *Bakers Digest*, 23, 51–54, 1949.

TABLE IV—HOW Gassing Power and Maltose Value Are Affected by Adjusting Flour With Various Alpha-Amylase Sources to About Same Maximum Viscosity*

Supplement Type	Supplement Amount (mg./100g. Flour)	Gassing Power Six-Hour (mm. of Hg)	Maximum Viscosity (B. U.)	Maltose Value (mg./10g. Flour)
Malted wheat flour	250.0	484	180	226
Fungal	224.0	750	210	493
Bacterial	29.5	368	180	277

* Data of Johnson, Dirks, and Shellenberger (ref. Table III).

TABLE V—EFFECT of Various Sources of Supplements on Baking Results*

Supplement Type	Supplement Amount (mg./100g. Flour)	Loaf Volume (cc.)	Grain (Percent)	Texture (Percent)	External Appearance	Remarks
Flours adjusted to same gassing power						
Malted wheat flour	250.0	3075	96	95	Very good	Excellent dough properties
Fungal	6.3	3188	90-o**	90	Good	Soft dough
Bacterial	63.2	2968	70-o	70	Very good	Sticky, gummy bread crumb
Flours adjusted to same maximum viscosity						
Malted wheat flour	250.0	3075	95	95	Very good	Excellent dough properties
Fungal	224.0	....	....	....	.....	Sponge dough liquefied, impossible to handle
Bacterial	29.5	3075	80	75	Very good	Sticky, gummy bread crumb

* Data of Johnson, Dirks, and Shellenberger (ref. Table III).

** o Means open.

starch susceptibility, pH, and salts, in addition to alpha-amylase activity.

The dextrinogenic method of controlling supplementation is a direct measurement of alpha-amylase concentration unaffected by the various factors influencing the other methods of control. It is based on the time required to hydrolyze a standard amount of gelatinized starch to give a dextrin solution which produces a certain red brown color in the presence of iodine.

Gassing power and maltose values, as well as viscometric values, are related to the total alpha-amylase present, although they are not a true measure of alpha-amylase. In order to show the relationship among various methods of control, flours were supplemented with enzymes from different sources and various technics of control were employed.

Raising Amylase Concentration

The effect of different concentrations of alpha-amylase from malted wheat flour and a fungal preparation on maximum viscosity and gassing power are shown in Table I. As the relative concentration of alpha-amylase from both sources was raised, the gassing power likewise increased, while the maximum viscosity decreased. Fungal alpha-amylase, however, was not as effective in reducing the maximum viscosity as the malted wheat flour alpha-amylase. These data demonstrate that entirely different amylase supplementation would be recommended, depending upon which method would be employed to control malt supplementation.

About Liquefying Starch

The inefficiency of alpha-amylase from the fungal preparation in liquefying starch is mainly due to lack of thermostability, as shown in Table II.

The bacterial alpha-amylase, in contrast with the fungal preparation, has a high degree of thermostability.

Additional data illustrating the utilization of various methods of controlling supplementation were obtained by adjusting a flour with malted wheat flour, fungal, and bacterial amylase supplements to give a series having the same gassing power (see Table III and graph).

The maximum viscosity ranged from 100 to 820 Brabender units, while the maltose values ranged from 171 to 347. The large variation in maximum viscosity may be expected when considering the temperatures that inactivate alpha-amylase from the different sources. The effectiveness of the three alpha-amylase sources in liquefying starch during baking would be in direct order to their inactivation temperatures.

Conversely, it is interesting to examine the effect on gassing power and maltose value when flours are adjusted to give equivalent viscosities (shown in Table IV). When sufficient fungal alpha-amylase was added to flour to lower the maximum viscosity to that of malted wheat flour, the gassing power and maltose value far exceeded those of either the malted wheat flour or bacterial supplement.

Since bacterial alpha-amylase is inactivated at a higher temperature, it might be expected that smaller amounts would be required for an equivalent lowering of the maximum viscosity without proportional increase in saccharifying activity.

Bread Baking Best Test

Since the maximum viscosity, gassing power, and maltose value (as means of controlling malt supplementation) yield divergent results, the bread-baking test still remains the final criterion of proper supplementation (Table V).

The series of flours with similar gassing power has indicated that malted wheat flour produced the most satisfactory results. The fungal preparation caused the dough to slacken slightly, and the grain became more open and the texture more harsh. There was evidence of too much proteolysis at this concentration.

In other studies, lower concentrations of the fungal preparation have proved useful in improving the baking quality. The results indicate, however, that with various sources of amylase supplements the gassing power determination would not prove an adequate control measure.

The bacterial preparation, although capable of stimulating gas production during fermentation, caused the crumb of the baked bread to be sticky and gummy due to excessive starch hydrolysis during baking. Similar effects have been observed when high concentrations of malted wheat-flour alpha-amylase have been used.

Because of its low thermal inactivation temperature, fungal alpha-amylase, even at high concentrations, has not been known to produce sticky or gummy characteristics. This property is actually an advantage for the fungal enzyme, since it precludes the harmful effects of an excess amount of alpha-amylase. When the series of flours was adjusted to give equivalent maximum viscosity, the fungal supplement caused excessive protein degradation because of the accompanying proteolytic enzymes.

It would appear that both gassing power and maximum viscosity determinations are of value in controlling supplementation. However, consideration should be given to the relationship between thermal inactivation of alpha-amylase and the temperature of starch gelatinization, and also to the relative potency of alpha-amylase and proteolytic enzymes in the supplement. The amount of proteolytic enzymes that may be present must be critically controlled.

However, the amount of alpha-amylase that may be needed for the most beneficial effects in baking does not appear critical. Only exception is that the alpha-amylase must be inactivated by heat during baking before excessive starch hydrolysis takes place.

In the opinion of the authors, the best method for measuring and controlling the level of alpha-amylase in malt supplements is the modified Wohlgemuth dextrinization method[6], which employs excess beta-amylase. This procedure does not require elaborate equipment. The method is also very flexible as to quantities of enzymes employed, and it can be performed very quickly.

Since starch concentration and susceptibility, pH, and temperature are rigidly controlled, this method is not influenced by factors which affect procedures previously described. The results are solely dependent on alpha-amylase activity.

The method for measuring proteolytic activity employed in this laboratory has been a modification of the Ayre-Anderson procedure[7]; using Bactohemoglobin as a substrate—a method that, in the presence of proteolytic enzymes, is highly correlated with the softening of doughs during fermentation. The procedure has been subjected to a collaborative study[8], and it has given very satisfactory results among several laboratories.

Advantages In Using Fungal Enzymes—

- **Regulation of amylolytic and proteolytic activity.**
- **Reduction of "buckiness" in doughs by increasing their mobility during fermentation.**
- **Control of dough consistency**
- **Improvement of loaf volume, and of crumb characteristics, including—**
- **Increase in softness of crumb**
- **Elimination of possible sticky crumb due to an excessive amount of supplements.**

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Five more fungal enzyme considerations—straight dough vs. sponge baking, stability of proteinase and alpha-amylase, modification of properties of dough by enzyme supplementation, influence of fungal enzymes on bread quality, and response of flours to supplements—will be discussed by the authors in the concluding Part II of this article, to appear in an early issue.

Both Part I, above, and Part II, to follow, are based on Contribution No. 191, Department of Milling Industry, Kansas Agricultural Experiment Station—a report on cooperative investigation by the Division of Cereal Crops & Diseases, Bureau of Plant Industry, Soils & Agricultural Administration, USDA, and the Department of Milling Industry, Kansas State College.

LEGALLY IT'S THIS WAY

Here are ten higher court decisions involving food manufacturers that will help you stay on the sunny side of the law

LEO T. PARKER
Attorney-at-Law, Cincinnati, Ohio

The food processor follows a wise course when he keeps his eye on the legal decisions of today. For they offer the best possible forecast of what the legal thinking will be tomorrow—when he himself may find quick need of facts for action.

Particularly to be noted are the rulings in those cases where the background circumstances most closely parallel his own. And such parallels were specifically kept in mind in the selection of the ten cases discussed below:

1.—"No Recourse" Means Just That

A FOOD INDUSTRIES reader has asked this question: "If a sales contract contains an 'as is' clause, is the seller relieved from liability for verbal guarantees and promises made by the seller or his representative?" According to a recent higher court decision the answer is "Yes."

For example, in *Garofalo Co.* v. *St. Marys Packing Co.* (90 N. E. 2d 292), the testimony showed facts as follows: The St. Marys Packing Co. sold to the Garofalo Co. 900 cases of tomato juice, for which the buyer promised to pay on delivery. The memorandum of sale shows a sale by the seller to the buyer of 900 to 1,000 cases of "rusty" cans of tomato juice at $2 a case delivered "as is, no recourse".

At the time the sale was made, the purchaser believed, and later testified, that the seller verbally stated that the terms "rusty" and "as is" referred *only* to the outside condition of the cans, but that the cans and contents would be fit for the purpose of resale to others and for ultimate human consumption. The customers who purchased the canned tomato juice from the purchaser, Garofalo Co. returned the product as being unfit for human consumption, in that the rusty condition penetrated the cans and caused spoilation of the contents. And soon afterward the health department of the city condemned the canned juice as being unfit for human consumption.

Garofalo Co., the purchaser, then sued the St. Marys Packing Co. to recover $2,240.45, the amount paid for the canned juice.

The purchaser testified that the seller was liable because he verbally stated that the rusty condition of the cans did not affect the contents. Nevertheless the higher court held the seller *not* liable, and said:

"The words 'as is, no recourse' when considered together and applied to the 'rusty' cans of tomato juice sold, clearly state the intent of the parties. In plain language, the parties contracted that the cans of tomato juice were to be delivered 'as is' and that plaintiff (Garofalo Co.) would have no recourse. Words are to be understood in their ordinary significance. 'No recourse' means no access to, no return, no coming back upon, no assumption of any liability whatsoever, no looking to the party using the term for any reimbursement in case of loss, or damage, or failure of consideration in that which was the cause, the motive, or the object of the undertaking or contract."

For comparison, see *Roby Co.* v. *Cade* (158 So. 840). Here, the court said that the expression in a sales agreement that goods are sold "as is" implies that the buyer is taking delivery of goods in some way defective and upon express condition that he must trust to his own examination.

2.—Government and Science

The outcome of a newly decided higher court law suit concerning misbranding of food products clearly illustrates the scientific methods used by government agents in proving a case.

For example, in *United States* v. *"Figlia Mia Brand"* (179 Fed. 2d 519), it was shown that the government condemned many cans of edible oils which were branded "Figlia Mia Brand, a blend consisting of 90 percent vegetable oils, choice cottonseed, corn and peanut oils, plus 10 percent pure olive oil, 1 gal. net". Also, the government condemned several cans of oil labeled: "Pace O Mio Dio Brand, 80 percent choice peanut oil and 20 percent pure olive oil, 1 gal. net."

The government agents contended that the oil was adulterated within the meaning of the Federal Food, Drug & Cosmetic Act in that (1) it contained little, if any, olive oil, (2) artificial flavoring had been added to simulate olive oil, and (3) squalene had been added.

During the trial, the counsel for the Antonio Corrao Corp., which had marketed the oil, contended that the government agents had no direct proof on which to base their contentions.

The government presented this interesting testimony: Squalene is a hydrocarbon found in olive oil. The squalene content of blended edible oils is the universally accepted criterion of the amount of olive oil present in a blend. However, squalene is also found in shark liver oil and it is impossible to distinguish one squalene from the other. Consequently by adding shark liver squalene to peanut oil a blend can be produced which will appear to contain 10 or 20 percent of olive oil, although in fact it contains little or none.

Knowing that the commercial source of shark liver squalene was a distilling company in Rochester, government agents "marked" it by mixing a small amount of anthranilic acid in the Rochester company's product. If any of this "marked" squalene were added to peanut oil to make the blended oil measure up to the squalene test for olive oil, the fraud could be detected by using a chemical that would cause the anthranilic acid to take on a reddish hue. This chemical test was applied to the seized samples of oil marketed by Antonio Corrao Corp. and it was disclosed that they contained anthranilic acid.

In view of this testimony, the higher court held that the product was misbranded in that the label statements as to the percentage of pure olive oil were false and misleading.

3.—Avoid Liability

Several readers have asked these questions: "If the owner of stored food products sues a warehouseman, claiming that the products spoiled or were damaged while in storage, what testimony or proof can the owner of the products give to recover damages? And what testimony enables the warehouseman to avoid liability?"

The answer is: In order to avoid liability for spoiled or damaged food products, the warehouseman must introduce testimony that *convinces a jury* that he exercised the same degree of care to safeguard the stored goods as would have been used by the average, reasonable and prudent person to safeguard his own merchandise under the identical circumstances.

In *A. Levy* v. *Brugetti Warehouse Co.* (205 Pac. 2d 759), the testimony bore out that the Levy Co. delivered to Brugetti Warehouse Co. 5,000 lb. of frozen shrimp, in 100 cases of 50 lb. each, to be stored and kept by the warehouse company in a frozen state. The shrimp was packed in cases of soft corrugated cardboard and each case held 10 waxed cardboard cartons, each containing 5 lb. of shrimp frozen in a solid block.

The Levy Co. sold 99 cases of the stored shrimp to various customers and these were found by the purchasers to be in good condition.

Three months later, the Levy Co. discovered that 3,450 lb., or 69 cases, were spoiled and unmarketable. The company sued the Brugetti Warehouse Co. for damages, contending that since purchasers of some of the shrimp had not complained this proved that all the shrimp were in good condition when placed in storage. However, the Levy Co. did *not* prove that the temperature maintained in the warehouse was such that the shrimp could have spoiled while in storage.

Conversely, the warehouseman showed, through employee testimony, that at all times the temperature in the warehouse was the proper temperature for keeping shrimp in the same condition as when stored. Furthermore a chemist testified that bacteria are always present in shrimp; that as soon as they are frozen, bacterial action will be arrested and stopped, and they will be in the condition in which they were frozen until rethawed again.

In view of this testimony the jury held the warehouseman *not* liable. The higher court approved the verdict, saying:

"The jury found that the shrimp in question was not in good or usable condition, fit for human consumption, when delivered to defendants, and it also found that defendants were not negligent in the operation of their plant. These findings are supported by substantial evidence and cannot be disturbed. The plaintiff has failed to show that the temperature maintained at defendants' plant, during the time the shrimp was there, was such as to cause the damage complained of, and the evidence produced by defendants was that the proper temperature was maintained at all times. The defendants are warehousemen who are liable not as insurers, but only for a failure to exercise ordinary care."

4.—Carrier's Liability

According to a late higher court decision, if the manufacturing costs of a shipped food exceed the contract price, a manufacturer cannot enhance his damages and recover from the carrier more than the cost of manufacturing the goods.

For illustration, in *Meletio Sea Food Co. Inc.* v. *Gordons Transports, Inc.* (191 S. W. 2d 983), it was shown that an interstate shipment of food was sent to a manufacturer's customer at an invoice price, at destination. While in the hands of the carrier, this food became tainted with turpentine. The manufacturer made replacement to the customer.

In a subsequent suit filed by the manufacturer against the carrier, the higher court held the manufacturer *not* entitled to recover from the carrier the price contracted to be paid by the customer, but it could recover substantially the actual cost price.

5.—Patent Is Granted

Modern higher courts consistently hold that an inventor may obtain a valid patent on a new process which effects advantageous results.

In *Application of Taylor* (183 Fed. 2d 77), it was shown that an inventor filed for a patent on a process for the preservation of comestible, perishable materials normally containing high proportions of water, such as meat, fish, vegetables, fruits, and the like. The invention consisted merely of treating these food stuffs with the chemical chlorine dioxide.

Although the Patent Office Examiner refused to grant a patent, the United States Court of Customs & Patent Appeals held that the inventor was entitled to a patent:

"The chemical treating agent disclosed in the patent consists of germicidal gas or volatile liquid or solid, harmless to the foods in which it is placed."

6.—Who Owns Patent?

Considerable discussion has arisen over the legal question: When does an employee own a patent on an invention he patented?

According to a recent higher court, where a person is employed to devise, perfect or invent, he cannot, after successfully accomplishing the work for which he was employed, file an application for a patent in his own name. In other words, whatever rights as an individual he may have had in his inventive powers he has sold in advance to his employer, who paid for his time, work and effort.

Thus, in *Marcalus Manufacturing Co. Inc.* v. *Sullivan* (60 Atl. 2d 330), it was shown that a company employed a regular chemist, but he was busy with the general chemical problems of the company. It was decided that an outside chemist should be hired who could devote his time to the discovery and development of a new process. Accordingly, the president of the company contacted a chemist named Sullivan and explained what he desired. It was agreed that Sullivan, who worked regularly for a large food concern, should receive $5 an hour for time he spent on the side on the Marcalus Co.'s problem. Subsequently Sullivan worked on the problem at his own home at night, for a total of 11 months.

In subsequent litigation, Sullivan explained to Marcalus that he had perfected the invention—but not during the time he was paid $5 an hour. Sullivan maintained that he had perfected the process on his own time.

Notwithstanding this testimony, the higher court ordered Sullivan to assign the invention to the Marcalus Manufacturing Co., and said:

"Sullivan attempted to justify his refusal to turn over the formula by stating that it was discovered when he was not working for Marcalus. Sullivan also testified that the final formula was in no way related to the research he had been doing throughout the year. He insisted that his

Yes or No?

Does an "As Is" contract mean *as is*?
Is the warehouseman liable for spoiled frozen foods?
Is a carrier ever liable for sale price of foods?
Is the company always entitled to an employee's patent?
Can you copyright color arrangement on a label?
Need you be stuck on an ambiguous contract?

work for Marcalus had been of no value to him in reaching the ultimate result. Sullivan's testimony is not convincing."

Hence, in this case the higher court decided that Marcalus owned the patented process, because Sullivan perfected it while being paid by Marcalus.

In order to avoid similar litigations, employers may include in contracts of employment a clause to the effect that the employee will assign to the employer *all inventions and patents conceived, devised and obtained during the full period of the employment.*

7.—Ambiguous Contracts

Modern high courts consistently hold that an ambiguously written contract will be interpreted most strongly against the writer of the contract.

For illustration there is the case of *Armfield* v. *McClure Co.* (75 Atl. 2d 196). The McClure Co., engaged in the food brokerage business, took orders from wholesalers for manufacturers of food products. The manufacturer billed the wholesaler, and payment of commission to the broker was usually made when the manufacturer was paid. From May 1947 to Feb. 20, 1948, the plaintiff, Armfield, was employed by the company as a salesman. His compensation was 40 percent of the gross commissions received by the company on all business from firms in the territory.

In February 1948, Armfield announced that he intended to go into business for himself, whereupon the company persuaded him to remain in its employ under a written contract. The contract contained a clause that the company guaranteed Armfield the sum of $5,000 a year "as long as he covers the territory in the manner it has been handled as to sales and obtains satisfactory results as prior to this agreement".

Soon after the contract was signed, a disagreement arose between Armfield and the company whereby it was alleged that Armfield's services were generally "unsatisfactory." Armfield was discharged, and he sued the company for salary due. In holding in favor of Armfield, the higher court said:

"The contract was one for hire at the rate of $416.67 a month in accordance with the guarantee. The contract is clearly open to a construction that the guarantee of a minimum monthly payment of $416.67 was the inducement that led plaintiff to sign the instrument and remain in defendant's employ. Since the contract was written by defendant, the language adopted by the writer will be given its ordinary meaning and under the above-cited authorities will be construed more strongly against that party."

8.—Libel Law Question

Considerable discussion has arisen over the question: Is a state law valid which requires packers to label containers showing the kind of food products contained therein? According to a recent higher court the answer is "Yes".

In *State* v. *Double Seven Corp.* (219 Pac. 2d 776), there was litigated the validity of a state law that required companies packing horsemeat for human consumption to clearly label the product "horsemeat." Also, the state law required horsemeat to be slaughtered in separate establishments. This legislation had sought to make it more difficult for the unscrupulous to sell horsemeat products as substitutes for other meat products. It also aimed to avoid the possibility of innocent mistakes of confusing horsemeat with other meats.

Contention was that the law was invalid because its purpose was not primarily to protect the public against impure or injurious food products. However, the higher court held the state law valid, saying:

"The public interest, which this legislation is seeking to safeguard, is that of protecting the public from deception and fraud. In the exercise of its police powers the state has a wide scope of discretion. It is our opinion the said act is not unconstitutional."

9.—Valid Trademark

Several readers have asked this question: "Can a manufacturer of food products obtain a valid trademark on a color arrangement or combination?"

Modern higher courts consistently hold that the function of a trademark is to indicate the origin of the product to which such mark is applied. It may consist of any symbol, emblem, device or words, but according to a late higher court "color" is *not* any part of a valid trademark.

In *Life Savers Corp.* v. *Curtiss Candy Co.* (182 Fed. 2d 4), Life Savers sued Curtiss for trademark infringement and unfair competition. Both these corporations manufacture and market hard candy disks of various colors and flavors in cylindrical-shaped packages or rolls. Specifically, the Life Savers candies each have a hole in the center, whereas the disks of the competitor do not. Wrappers for the various fruit-flavored disks have a background of an appropriate identifying color.

Thus, both companies market lime flavored candy disks in wrappers with a green background, lemon disks in wrappers with a yellow background, wild cherry in wrappers with a red background, and orange in wrappers with an orange background.

Life Savers Corp. contended that Curtiss infringed its trademark because it used the colored striped background of the label, which the former registered in the United States Patent Office in 1905.

It is interesting to observe that the higher court refused to hold Curtiss liable. This court said:

"The color of the background is in fact descriptive and serves as a ready identification of the flavor of the candy in the package. The use of a combination of colored stripes as a background indicates to the consumer that the package contains an assortment of candy disks or tablets of various colors and flavors. It has long been common practice in the packaging art for the label of a package, can, or other container, to show a colored replica of the contents. As a rule, color cannot be monopolized to distinguish a product."

10.—Consumer Made Ill

A food manufacturer has asked, "When and under what circumstances may a food manufacturer be liable to a consumer made ill by eating the food?"

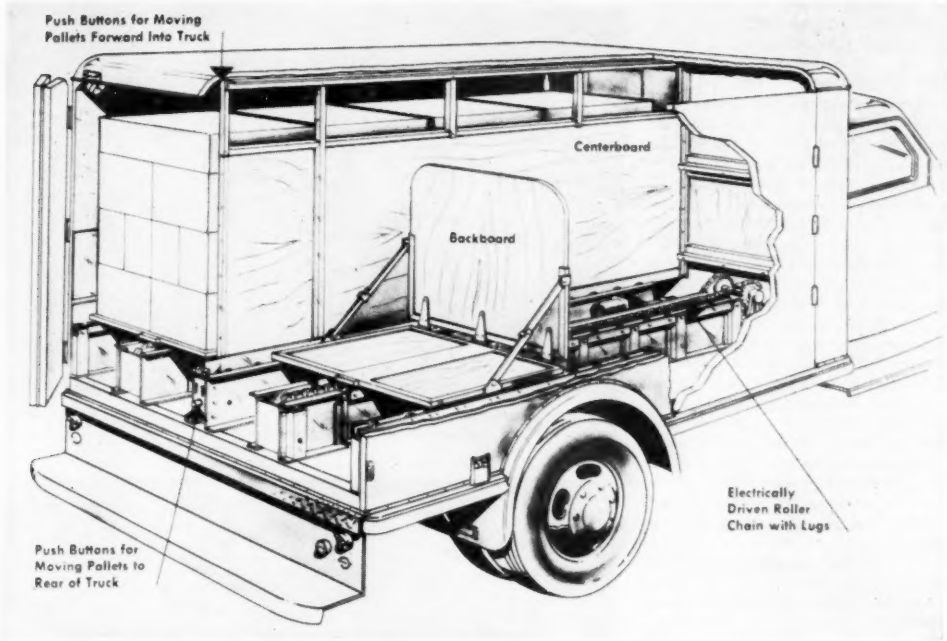
According to a recent higher court, corporations, firms, and individuals who engage in the business of preparing food for consumption are required to use "reasonable care" with respect to its fitness and may be held liable for damages if, by their negligence, unwholesome products containing a foreign substance or deleterious matter are sold and persons are made ill thereby.

For example, in *Danker* v. *Fischer Baking Co.* (68 Atl. 2d 774), the testimony showed that the plaintiff, Danker, purchased some crullers, immediately took them to her home, removed them from the package in which they had been placed at the time of purchase, and put them upon a dish on her dinner table without anyone else having touched them. While eating one of the crullers, Danker felt a sharp pain in her throat. She went into the bathroom and tried to bring up the object which had caused the pain. This attempt being unsuccessful, her husband then took her to the hospital. Finally, a small splinter covered with "pus" was taken from her throat.

Danker sued for heavy damages, and the court said:

"We are convinced that plaintiff's proofs, and the reasonable inferences to be drawn therefrom, established a *prima facie* case of actionable negligence against the defendant and that the trial court was justified in submitting the case to the jury."

"Sliced" Truck Helps Carry Out New System


Push Buttons for Moving Pallets Forward Into Truck
Centerboard
Backboard
Electrically Driven Roller Chain with Lugs
Push Buttons for Moving Pallets to Rear of Truck

UNIT LOADING on chain conveyors and using partitions keep product compact and easy to unload.

Kraft *Zones* Its Distribution

Delivery costs are cut 25 percent through a system that begins with the assembly in the warehouse and carries through to the retailer's door

Perfection of a system of warehouse-to-store door distribution that cuts delivery costs by as much as 25 percent has been achieved by the Kraft Foods Co.

While the method—called the Zonor system—has been tailored to fit the particular needs of Kraft, its principles are offered to the whole food industry in the belief that, with some variations, it will fit into practically every distribution business and result in similar savings.

■ **Included is a new delivery truck mechanism that permits loading and unloading without need for the driver ever entering the truck body.**

Officials stress that Zonor is a system—a complete system—and unless all or most of it is put into practice, distribution savings as made by the company cannot be duplicated.

The system replaces one in which the salesman was closely followed on his route by a delivery truck—a time consuming and relatively inefficient operation. How time is saved and efficiency keyed to a high point will now be related.

How It's Done

In establishing the system, the company divides local distribution into four parts:

1—Zone layout and delivery pattern
2—Selling pattern
3—Warehouse assembly of orders
4—Memo billing system of bookkeeping

Let us consider establishment of the system step by step: Kraft first makes an exhaustive analysis of the sales and delivery territory served. It is stressed that this survey must be complete, accurate, and extremely detailed before any of the following moves can be made.

The company has teams of traffic and selling experts doing this survey work. However, it is suggested that it might be profitable to hire professional analysts to handle the job in cases where the interested distributor does not have such experts in his employ. The information gathered details the number of customers in the distribution territory, the average tonnage of each customer, the frequency of orders, the mileage salesmen and deliverymen must cover to serve these customers, and many other factors.

With this complete information at hand, the territory is divided into zones. Basically, a zone is the territory (1) that can be covered in one

sales day by the selling force and (2) in which delivery can efficiently cover the customers with a minimum of delivery equipment.

Zones Equalized

The zones are laid out to cover the entire territory being serviced. Ideally, zones would be laid out in regular equal-area divisions around the distribution center. However, actual geographical distribution requirements usually dictate zones that are irregular in shape in order that each may contain approximately the same sales potentialities. Zoning removes the haphazard methods so frequently found. It concentrates delivery routes geographically and eliminates losses through part loads and long jumps between delivery stops.

Both the selling and delivery pattern by zoning saves manpower. For fewer salesmen are required to move the same or a greater volume of goods using the new system. And further, delivery personnel are better utilized, with an almost complete elimination of overtime.

One of the extremely important points in the operation is the warehouse order assembly system developed by the company after years of experimentation and observation of many ways of assembling orders.

Here the order assembly area is arranged in a U-shape, with one man filling orders on specially designed pallets in the center of the area. In this "U," products are arranged in the order of greatest demand, together with consideration of weight per item. Those products most frequently handled and heavier in weight are placed in the center of the sides of the "U." The lighter weight, less frequently ordered items go to the ends of the area.

Bulk stock is replenished from storage areas outside the filling area by use of an electric fork truck. At this point, a system of inventory control may be established, with stock being charged to the order-filling department at the time it is removed from bulk storage.

It has been found that in the Kraft line one order filler can load up to 25,000 lb. of merchandise in a normal working day, placing it on the pallets in such a way that it will come off in the proper order on the delivery routes. When greater order filling capacity is needed additional U-shaped areas, with order fillers, are set up.

Light Pallets

In the center of the order-filling "U", two rails—elevated about 4-in. —support the special pallet that is used. This pallet is thin-metal bound,

Saved Steps All Along the Line

1 **WAREHOUSE** order filler arranges goods in U-shape with most frequently ordered and heaviest items within easiest reach.

3 **REFRIGERATED** products are protected by insulating blankets, if destined to be held overnight on dock or truck.

5 **NO CLIMBING** on and out of this mechanized truck, for each unit in load is conveyed right up to tail edge.

Add Up to Efficient Distribution

2 **ORDERS** are placed on pallets so that the unloading will be in proper order, then carried to loading docks for delivery.

4 **PUSHBUTTON** moves loaded pallet forward on endless chain to make room for next unit of the load assigned to truck.

6 **EMPTIED** pallets are stored in the vacated forward area of the truck as unit deliveries are unloaded.

without rails attached, and weighs approximately 25 lb., as compared to the 65 lb. of a conventional pallet with rails attached. The floor rails, which permit mechanical fork truck pickup of the flat pallet, may be moved to any desired location within the order-filling area. Pallets that are to be loaded first in the delivery truck have a lightweight hinged back to keep the load from shifting.

When the pallets are loaded they are removed from the order filling area and placed in racks on, or adjacent to, the dock loading area. This permits easy fork truck pickup and rapid loading in the delivery truck. In fact, with this system it is not necessary to have a loading dock since electric fork trucks can easily load the assembled orders into delivery trucks from ground level.

To meet the company's particular needs, order filling has been set up both in the dry storage areas and in refrigerated areas. The only difference in the two procedures is that in the refrigerated areas the pallets of perishable merchandise are held on storage racks in the cooler until time to be loaded on the trucks. In this way the merchandise retains sufficient refregeration to arrive at its destination in prime condition.

To meet the needs of overnight layovers on distant deliveries of perishables, the pallet loads are encased in double kapok-padded blankets while held in the cooler. It has been found that sufficient refrigeration is retained during delivery to insure perfect preservation at much lower cost than by mechanical or other refrigeration in trucks.

Saves Bookkeeping

Memo billing incorporated in the system, while not new, is an important part of the method. In taking the order originally, the salesman notes quantities on an order form, which has sufficient carbons to use in delivery, collection, and permanent bookkeeping records. On returning to the distribution center after covering his part of a zone, the salesman turns in his orders. They are routed directly to the order-filling department. Since the order is filled the day after it is taken, shortages, weight of bulk items, and other information necessary to the deliveryman and retail customer, are noted on the form by the order filler.

A copy of this order form, with quantities and weights checked against the order as it is filled, goes to the deliveryman. He presents this form as a memo of receipt at the time of delivery and secures the acknowledgment of the customer

This memo showing quantities and delivery then goes to the bookkeeping department, where it is extended to note shortages, or goods returned for credit. The bill is then turned over to the salesman for collection on his next call. And when collection is made, a copy of the form goes into the files as a completed transaction without the necessity of ledger entry or other time-consuming bookkeeping work.

Again, as in the selling and delivery operations, there is a great saving of manpower in the bookkeeping department, with virtual elimination of night work and overtime. Many of the methods tried previously called for extensions of the order at night so the order would be ready for filling the following morning. Then, when shortages occurred and were noted on the order, bulk weights were inserted, or any other changes were necessary, there was further work to do in the bookkeeping department before a bill could be presented for payment.

With orders filled, assembled on pallets, and stacked on racks, it is only a matter of minutes to load the mechanized truck and start the deliveryman on his way.

Easy Loading

Features of the truck, which are the subject of patent applications, include endless chains with lugs at intervals to catch the edges of the flat pallets. These chains are powered by the truck's regular storage battery and controlled by push buttons to move the loads either into or out of the truck. To meet Kraft's requirements, two sets of the chains are installed, one on either side of the interior of the body. Each may be moved in or out independently.

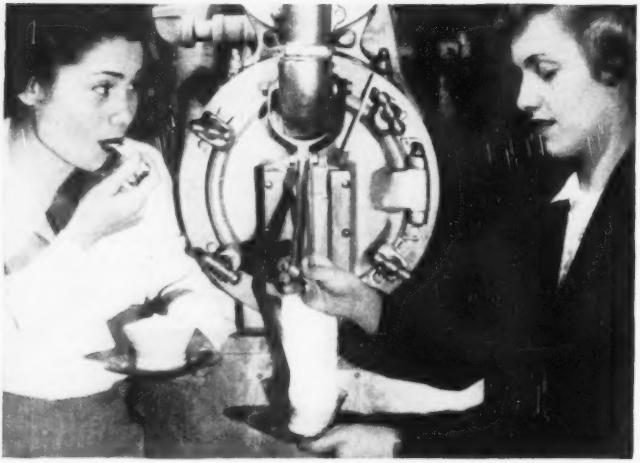
Also, for the company's purposes, the truck body is divided down the center with a light partition, to prevent sideways shifting of the load, while the hinged backs of the pallets prevent loads from shifting forward or backward. Pallet loads are placed, by fork truck, in the rear of the truck body on the endless chains. These pallets then are moved partly forward in the body and other pallets are loaded in turn until the entire load is completed. In this manner it has been demonstrated that 12,000 lb. of merchandise can be put on a truck in approximately 8 min.

At the first stop the deliveryman starts removing the order from the last pallet loaded. When that pallet has been emptied, it is removed and the deliveryman pushes a button, whreupon the mechanism moves the next pallet back to the rear into position for unloading. Company trucks are provided with a small side door at the front of the body to enable storing of the emptied pallets ahead of the remaining load.

In all of these operations there is no necessity for the deliveryman to get into the truck body. Eliminated is the tedious job of moving the merchandise to the rear and then climbing down to street level to complete the delivery.

Company officials say that this mechanism to make a truck self loading and unloading is extremely flexi-

(*Turn to page* 212)



WHETHER eaten soft (above) or hard, buttermilk ice cream is delicious. (USDA photo)

Buttermilk Builds Better Ice Cream

Sweet cream product, when used in place of skim milk, gives more flavorsome ice cream that whips easier

ICE CREAM of improved flavor and texture results when sweet-cream buttermilk is used to supply a major portion of the milk-solids-not-fat in the mix.

Overrun, too, is more easily and quickly obtained with the buttermilk-solids mix than with one containing skim milk solids.

These results were obtained by researchers at the Bureau of Dairy Industry, USDA, when working on possible uses for this dairy byproduct, now inefficiently utilized as feed for livestock, or wasted outright.

By applying results of related research they developed a method for preparing sweetened condensed buttermilk that compares favorably in keeping quality with sweetened condensed skim milk.

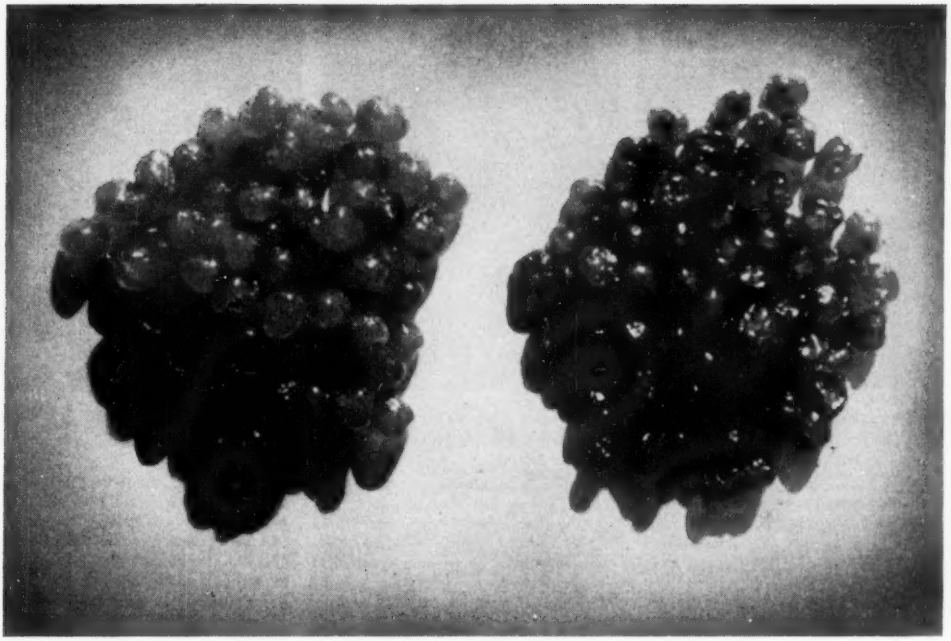
Details of Mix

This product was used to replace 80 percent of the sweetened condensed skim milk in an ice cream mix containing 12 percent butterfat, 10 percent milk-solids-not-fat, 15 percent sugar, and 0.25 percent stabilizer. The mix was pasteurized at 160 deg. F. for 30 min., homogenized at 2,500 psi., cooled to 40 F., aged 20 hr., and frozen.

When the resulting ice cream was tested by a taste panel, it was considered to be more flavorful and creamier in texture than ice cream made with skim milk solids. The researchers also found that they were able to obtain a higher overrun more easily and quickly with the buttermilk solids.

Credited for the above mentioned benefits is lecithin, a fat-like product that is 4 to 5 times more plentiful in sweet cream buttermilk than in the milk from which cream was derived.

Treated Contrasted With Untreated



FINE RED COLOR and top consumer appeal are apparent in phytate-treated cherries (left). In comparison, note black discolorations around stem holes and bruised tissue of untreated fruit (right).

Phytates Will Stop Cherry Discoloration

—thus improving marketability. Basis of new method, which extends pre-processing storage life, is removal of objectionable iron from the brine, syrup, and fruit

R. F. COHEE and JACK NELSON

Corn Products Sales Co., Chicago, and John C. Morgan Co., Traverse City, Mich., respectively

Recent experiments indicate that storage life of brined sweet cherries can be extended and grade-lowering of the processed maraschino type avoided by treatment of the brine, sugar syrup, and cherries with calcium phytate to remove iron.

These beneficial results became evident in the course of a study to determine the cause of, and find a remedy for, black discoloration of dyed and processed cherries from the 1948 crop.

The discoloration became pronounced in August 1949, when sweet cherries, carried over in SO_2 brine, were processed for marketing. It was so pronounced that all of the cherries were of definitely lower grade than they should have been, and many of them were not merchantable, although there was no deterioration in their eating qualities. Heaviest discoloration was around the stem holes.

Physical examinations and chemical analyses showed that dark brown and black areas also appeared in the presence of more than 25 ppm. of iron in cherries injured by limb rubbing, wind whipping, and lug scalding. In fact, any slight blemish showed immediate signs of darkening when the brined fruit was dyed and processed in sugar solutions.

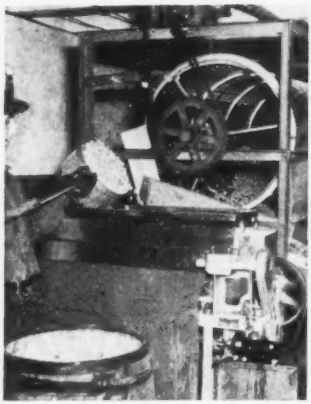
Usually, Northern Michigan sweet cherries are harvested during the latter part of June and the first part of July —about a 3-week season. The fruit is then held in brine for at least three months to become well bleached and hardened for future processing. Only enough fruit is brined to satisfy the year's need for processed cherries.

All of this stock is usually processed by early spring of the following year. But a departure was made from this

The 5 Steps of the Method

1. **Heat fruit in 50-deg. Brix sugar syrup to 150-160 deg. F.**
2. **Adjust syrup to 3.0 pH with citric acid crystals.**
3. **Add calcium phytate—0.2 percent by weight of fruit.**
4. **Let stand 24 hr.**
5. **Filter to remove precipitate.**

In Making Maraschinos →



1 **MECHANICAL** grading of brined cherries insures uniformity.

2 **PITTING** is by action of multiple, spaced plungers.

3 **HAND SORTING** removes crushed and defective fruit.

practice when a quantity of brined cherries of the 1948 crop was set aside in the spring of 1949 to start an anticipated processing in August—two months before the 1949 crop would be available.

Discoloration was apparent in this 14-month old stock, becoming definitely noticeable within a few days after processing. The brined cherries were found to contain approximately 100 ppm. iron. Also (as shown in Table II) the iron content of this fruit was higher than the brine in which it was preserved. Iron determinations were made by ashing the samples in a platinum crucible and titrating by the usual potassium sulphocyanate method.

Suspected sources of the iron were: The syrup line, dippers used in handling the fruit, rust from barrel hoops, spray residues, calcium carbonate, brine, corn syrup, and even the water supply (from Lake Michigan). Samples of the calcium carbonate used as a hardening agent in the brining were found to contain a very high percentage of iron. And preliminary tests indicated that the presence of as little as 25 ppm. iron will cause discoloration.

A consideration of the processing operations aids in understanding the role of these factors.

One of the standard methods of preserving sweet cherries for processing to the maraschino-type is to place the fruit in fir barrels shortly after picking and then fill the barrels with SO_2 brine containing calcium carbonate. This treatment[1] bleaches the fruit to a light straw color and firms it for pitting and further processing. Cherries properly brined will keep in excellent condition for more than a year.

Processing to the maraschino-type requires that the brined cherries be drained, sorted, pitted, and leached with running water to remove free SO_2. Then they are colored, with an FDA-approved food dye, and impregnated with sugars by immersing in syrups. Flavors are added when the treated fruit is bottled or barrel-packed in syrup.

While in this brine and syrup, the cherries have an opportunity to absorb other substances, such as iron salts, as well as the brine salts and sugar. Previous to 1949, blackening and discoloration had been less severe, and no successful method for the elimination of the darkened areas had been worked out.

[1] Bullis, D. E., and Wiegand, E. H., Oregon Agricultural Expt. Sta., Bul. 275.

Data Show How Phytates Work

TABLE I—PHYTATES Effectively Remove Iron From SO_2 Brines

	Source of Brine					
	Napoleon Cherries			Windsor Cherries		
	pH	Iron	Visual	pH	Iron	Visual
Brine alone	3.55	100 ppm.	clear	3.43	100 ppm.	clear
Brine with phytate heated to 195 deg. F.	4.18	ppt.	pink	4.1	ppt.	pink
Brine with phytate after 1 day and filtering	....	12.5 ppm.	clear	....	37.5 ppm.	clear

TABLE II—BRINED CHERRIES Contain More Iron Than the Brine in Which They Were Preserved

Cherry Varieties	Iron	
	In Fruit (ppm.)	In Brine (ppm.)
Napoleons	35	20
Windsors	50	35

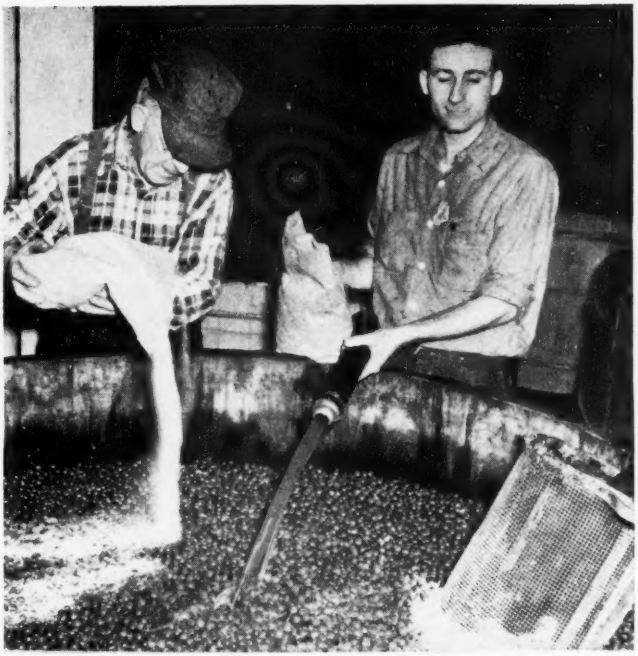
TABLE III—TIME Plays Important Part in Phytate Method of Removal of Iron From Cherries and the Preserving Brine; Acidity Rises

	Time, Hr.			
	24	48	72	96
Iron in fruit, ppm.	35	25	20	10
Iron in brine, ppm.	25	35	40	40
Brine reaction, pH	3.0	3.37	3.4	3.59

TABLE IV—PHYTATES Also Remove Iron From Maraschino-Type Cherries. Time is Important Here, Too

	Time, Hr.			
	0	24	48	72
Iron in fruit, ppm	35	20	20	10
Iron in 50-deg. Brix syrup, ppm.	35	50	50	75

4 **SYRUPING** and coloring are done in wooden tubs.



5 **NOW COMES** the new treatment (above). After syrup is acidified to pH 3 with acetic acid, calcium phytate is added to remove black spots and restore bright red color to the cherries. Process is speeded by recirculating the syrup through heat exchanger.

6 **AND FINALLY,** attractive fruit goes into bottles.

An encouraging approach to the solution of the problem came from a previously reported study on color removal from vinegar by precipitation of copper and iron through addition of calcium phytate[2]. Preliminary experiments on brine then indicated that treatment of brined cherries with calcium phytate was worth a trial. Results of these tests (given in Table I) proved significant with as little as 0.2 percent of calcium phytate by weight.

This product reacts in the acid brine to give phytic acid, which combines with the iron, in the brine and cherries, to form a light-colored precipitate removable by filtering. Heating of the brine in the presence of phytates, followed by filtering, results in a clear liquid that can be analyzed for residual iron content. Table III shows reductions in iron content of cherries and surrounding brine at four stages of a 96-hr. holding period, following treatment with calcium phytate.

It is significant that fruit containing more iron than the surrounding brine at the beginning of the tests showed decreasing amounts as time passed, and that the brine contained more iron than it did originally.

Trials With Processed Cherries

Encouraged by these results, the laboratory then attempted to reduce the very dark discoloration in previously processed glace cherries. Satisfactory results were obtained only when the syrup on the fruit had been reduced to 50 deg. Brix and pH adjusted to 3.0 with citric acid.

When the acidified glace cherries, in 50 Brix syrup, were heated to 150-160 deg. F. with 0.2 percent calcium phytate, a hazy white precipitate was formed. Its removal by filtration was followed by further heating and filtration. A progressive decrease was noted in the iron content of the syrup and cherries with each successive heating and filtration.

The laboratory procedure was applied to badly discolored fruit with dramatic results. Table IV shows how the iron content of fruit decreased and of the syrup increased.

The photo on the first page of this article shows the effect of phytate treatment on the black discoloration around the stem holes of brined cherries. The fruit seen on the left (treated) was much lighter in color than the untreated fruit (right), and did not contain dark discoloration around the stem holes. The dyed cherries also returned to their normal bright red color.

One theory to account for presence of iron in the cherries is that a physiological change takes place during healing of plant tissue. When the mature cherry is pulled from its stem, an injured area is produced around the stem hole. The fruit then establishes a concentration of tannin in the injured area to promote healing, even after the fruit has been picked. Subsequent brining, in the presence of an iron salt, results in formation of an iron-tannate that precipitates and remains in the fruit tissues. Further oxidating due to heating produces the characteristic black discoloration at the point of the original injury.

[2] Cohee, R. F., Jr., and Steffen, G., "Takes Heavy Metals Out of Acid Foods," FOOD INDUSTRIES, 20, 1746-48, 1895, 1949.

ON THIS new line, mass-production technics enable Boston packer to increase efficiency of the boning operation.

Up Goes Output on Continuous Boning Line

By conveying meats to boners and simplifying their work, packer's production has been increased 35 percent for hams and 44 percent for shoulders

ASSEMBLY-LINE, mass-production technics have put higher efficiency into boning operations at the meat-packing plant of Colonial Provision Co., Boston.

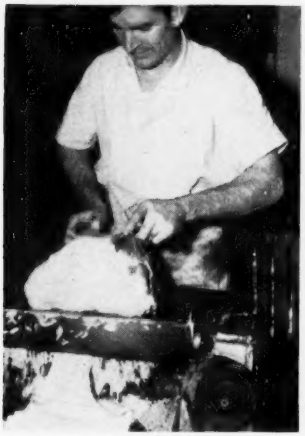
■ **Output boosts have been high—35 percent for hams and 44 percent for shoulders. Formerly, 19 workers boned 185 hams or 215 shoulders an hour by the batch method. Now, by the continuous straight-line system, the same number of men handle 250 hams or 310 shoulders an hour.**

Employed is a system of conveying hams and shoulders to the workers and also simplifying their jobs—in much the same manner as work in the assembly-line industries. Installed, also, were a de-rinding unit at the head and ham rolling-tying machine at the tail end of the conveyor line.

Conveying promotes efficiency two ways on the new boning line: It reduces the number of handlings formerly required, and it paces the workers to operate at the speed of the belt.

Formerly, workers performed the tedious three-step handling job of unloading meats from a nearby truck,

5 Highlights on Speedy Ham-Boning Line

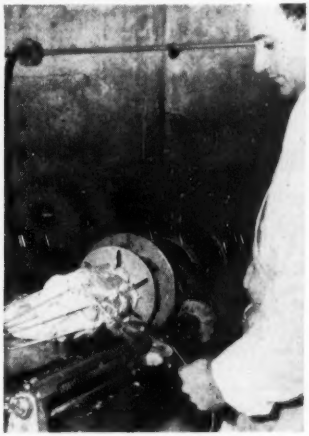


1 WORKER feeds hams into de-rinder, thus removing skins.

2 FED on belt, hams next go to trim-mers, who remove all excess fat.

3 NEXT, hams continue on belt to this station for deboning.

4 THEN, at end of line, trimmings, bones, and hams are sorted and put in separate trucks. Bones go to scrap and trimmings to sausage kitchen.



5 FINALLY, the boned meats are machine-rolled and string-tied.

stacking them on cutting tables, and then reloading boned cuts into another truck. There was also the incidental job of separating bones, skin, and fat.

These multiple handlings were not alone responsible for lost time by the batch method. Delays were also attributed to cluttering of the working areas by trucks containing boned and unboned meats, as well as by containers for bones, skin, and fat.

Basic-Practice Technic

This advanced system of conveying hams and shoulders to the workers was only part of the improvement. By adapting basic work-practices to the actual boning operation, productivity was further increased. What's more, worker morale was boosted by making the jobs easier.

In the old method of boning, workers had other jobs to do: (1) Trim the skin and fat; (2) remove the bones; (3) roll and string-tie the hams or shoulders; and (4) separate skin, fat, bones, and boned-rolled-tied meats.

Now this work has been simplified. Each worker performs only one operation instead of all four. Here are the sequence details of the new system:

First, 1 man at the head of the line takes a ham or shoulder from a nearby truck, removes skin with a de-rinding machine, then feeds the meat onto a rubber-belt conveyor. This belt is 1½ ft. wide and 40 ft. long, and on both sides of the belt are removable wooden cutting boards.

Second, 3 workers pick up meat from the belt and trim off the fat. Meat and fat are put back on belt.

Third, 14 workers farther along the line remove the trimmed meat from the belt and cut out the bones. Bones and boned meat then continue down the belt, along with trimmings.

Finally, at the end of the line, another man sorts trimmings, bones, and boned meat into separate trucks. Bones go to scrap. Trimmings and lean meat are later used in the sausage kitchen. Hams and shoulders are machine-rolled and tied. Hams are either stuffed into cellophane casings and smoked, or they are canned and cooked. Shoulders are placed in stockinettes and smoked.

Camera Briefs Operations From Filleting to Freezing of Fish →

1 FISH sorted into ice-filled bins are forked onto conveyor (since replaced by a flume) that carries them to filleting room (behind partition). Conveyor belt (beyond bins) returns excess fish from hand-filleting line.

2 ON FILLETING LINE, fish are conveyed to workers who cut them into fillets that are placed in 25-lb. pans on chain conveyor. Belts below table return surplus fish to start of production line and take offal to waste bin.

Fish Continuously Frozen in Towers

Each unit consists of 40 trays that can be adjusted to handle different size cartons. Pound packages of fillets are frozen to 0 deg. F. in about 75 min.

RAY BLOOMBERG
"Food Industries" Correspondent, Seattle

Continuous freezing towers that reduce the temperature of 1-lb. packages of fish to 0 deg. F. in 75 min.—with the whole operation completed less than 2 hr. after filleting—are the key to successful fish processing at North Pacific Frozen Products Co., Bellingham, Wash.

Although no specific figures are available, it is believed that over-all efficiency of these towers is greater than that of conventional methods. Reason: the operation is continuous and labor costs are lower.

What's more, production of high quality fish is assured because there are no delays in loading the freezing towers. The units accept each trayload of fillets individually—no need to wait for an entire "charge."

The Bellingham plant, one of most modern on the Pacific Coast, has a compound-compression system designed to furnish 31 tons of refrigeration at −45-deg-F. ammonia temperature, providing an average air temperature of −25 to −30 deg. F. Under these conditions, the combined food-freezing capacity of two towers is well in excess of a ton an hour. All refrigeration equipment is designed and manufactured by York Corp.

The wrapped fillet cartons are placed on an unusual 40 x 35-in. galvanized steel freezer tray with a false bottom. Between false and true bottoms is a 1¼-in. air space, broken only by Z-support forms. Sides of the tray are 1¼-in. high—the same height as a 1-lb. package.

Height of the trays can be increased to 1½-in. for larger size packages by placing a ¼-in. shim on the angle form. Conversely, the height can be reduced to 1⅛-in. for smaller size packages by inserting a ⅛-in. plate on the bottom of the tray. These height adjustments are necessary to secure compression in the freezing tower.

Freezing the Fillets

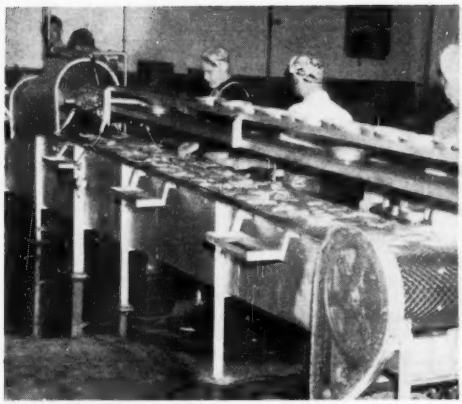
After a freezer tray has been filled with 64 1-lb. cartons of fish, it is rolled onto a mobile truck that is wheeled to one of the freezing towers. The tray is then inserted through an opening near the bottom of the tower, below 39 similar trays already in the unit. An operator now adjusts a three-way valve, activating an hydraulic ram that elevates the entire column and leaves the top tray suspended above the column between steel rails and the other trays resting on the bottom "dogs." Cartons in each tray are compressed by the weight of trays above them.

A second control then activates another hydraulic ram that pushes the tray suspended at the top onto an elevator. The lift lowers the tray onto the waiting truck, whose top frame has been tilted about 6 in. on the freezer side to receive the tray. Putting in the tray of fresh fish and removing the other tray of frozen product takes less than a minute.

The tray is then wheeled back to the roller table (from which it started) for easing and transportation by fork-lift pallet into storage at −10 deg. F. The plant has two 50 x 25-ft. cold storage rooms as well as a third room (20 x 20 ft.), which can be used for either storing or freezing. Cold air directed into this room by baffles from the freezing tower does the freezing. All storage rooms are fully palletized.

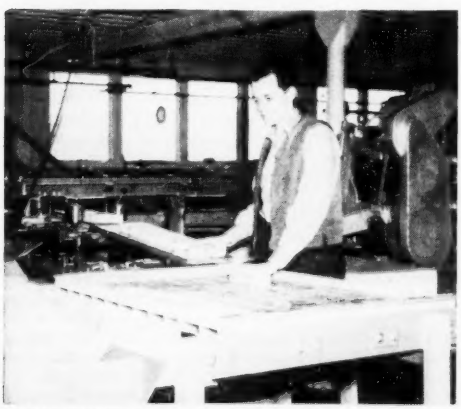
Within each freezing tower, a fan, driven by a 15-hp. motor, carries the air over the finned refrigerator coils and through the radiator sections of the upper trays at 1,200 ft. a min. The

3 **FILLETS** are inspected on this trimming table, where skin and bones overlooked by filleters are removed.

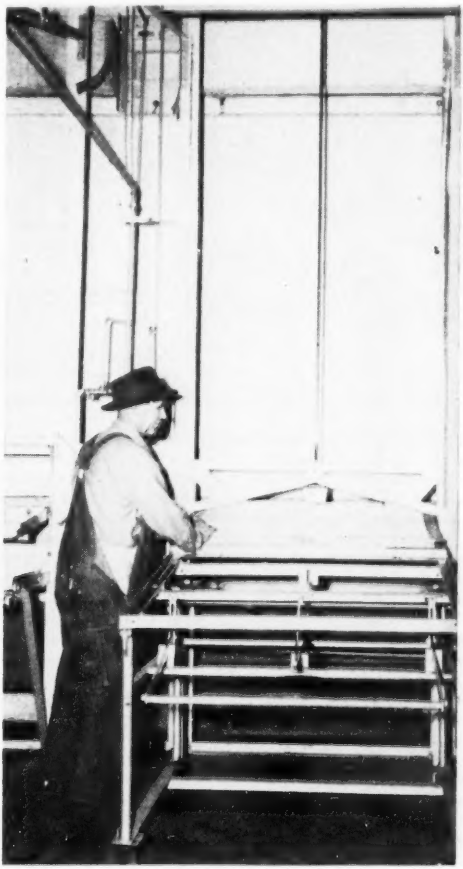


4 **INTO EMPTY PANS** (top belt), girls weigh 1-lb. lots of fillets. Filled pans are then placed on center conveyor.

5 **AT PACKING STATION,** girls remove fillets from pans and put them in 1-lb. folding cartons.

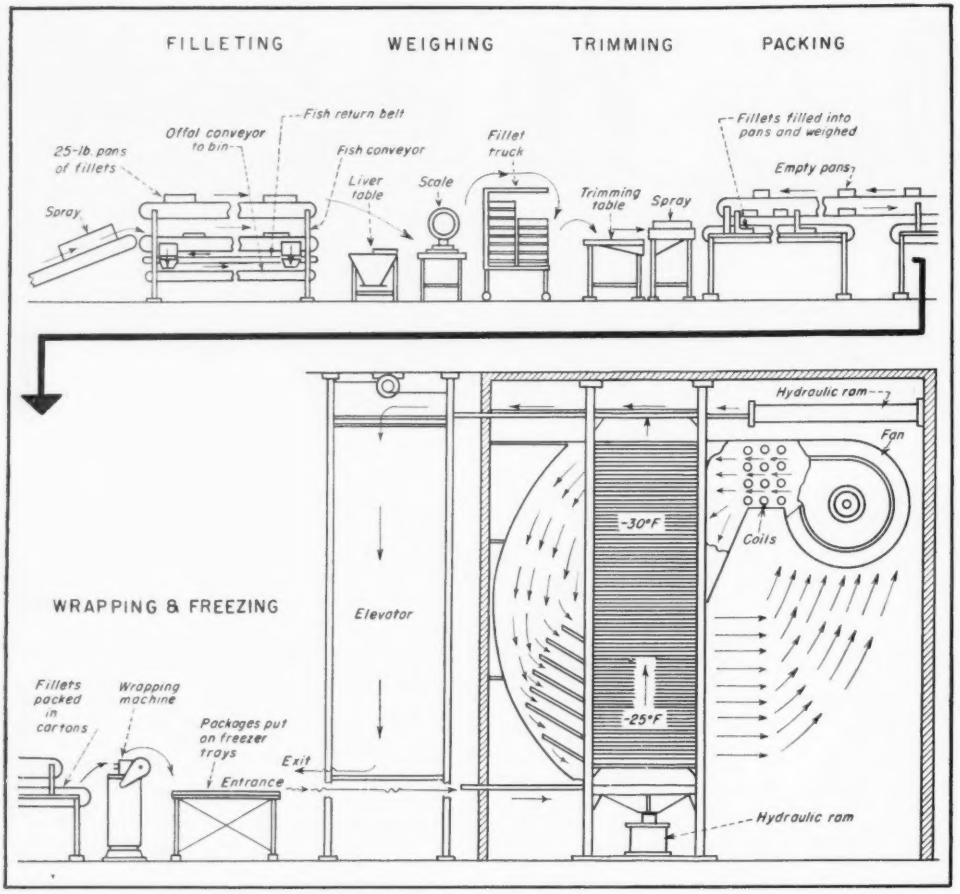


6 **COMING** from wrapping machine, cartons are arranged on trays that are trucked to tower freezers.



7 **TRAY** of frozen fillets is taken from tower and put on truck. At left is entrance and exit of second tower.

Steps in Preparation of Fish for Freezing



air is then baffled back through the lower trays and returned to the fan. Temperatures at the top and bottom of the column vary about 5 deg.—the top being colder.

Fishing boats discharge their cargo at the pier outside the North Pacific plant. Since Bellingham is 100 miles nearer the fishing grounds than Seattle, fish are received in top-quality condition. After fish are weighed, they are sorted into ice-filled bins. Size of the bins may be increased or reduced, as needed, by adding or removing planks between removable steel uprights extending from the floor. The fish are then forked into a flume that feeds them onto an elevator going through a 125-lb. pressure spray to the fillet line.

The plant employs about 20 filleters, whose output varies with the size and variety of fish. These workers are stationed on either side of a conveyor system. The men take the fish off an upper belt conveyor, cut them, and place the fillets in 25-lb. cans which, when filled, are placed on a chain conveyor leading to a scale.

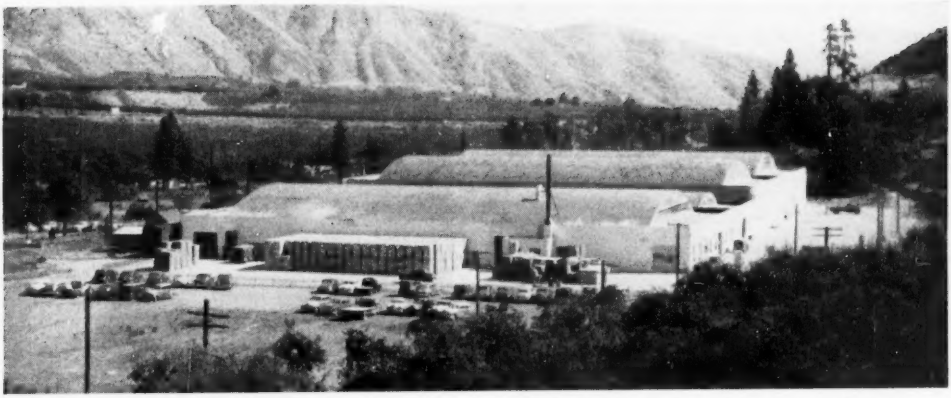
The offal drops through a chute onto a belt just off the floor. The belt carries the offal past a table, where livers are removed as desired. The rest goes on to a bin. Fish reaching the end of the line without being processed fall onto a return belt.

The fillets, after being weighed in the 25-lb. cans, are placed in a fillet truck. Ice is packed on the bottom of the truck and between each layer of cans. This truck is enclosed on three sides. The fourth side is built up until the truck is filled.

Operations up to this point are contracted under lease to Bornstein Seafoods, Inc, one of the largest fresh fish fillet operators on the Pacific Coast. North Pacific is thus able to obtain fillets in volume as needed without engaging in the local fresh fish market.

Fillets to be frozen are taken out of the truck and dumped on a trimming table having a flume in center. Here, they are inspected and pieces of skin or excess bone overlooked by the filleters are removed. Next, the fillets pass through a spray and drain on a mesh belt extending beneath a belt conveyor. The fillets are then taken off the mesh conveyor, placed in pans holding as much as 5 lb., and weighed. Empty pans move along the top belt and filled pans on the lower one.

Farther along the line, filled pans are removed from the conveyor and fillets are packed in cartons, which are carried by a lower conveyor to the wrapping machine. Packages coming from the wrapper are then placed on the freezing tray, with steel separators between each row to square the sides. As soon as the tray is filled, it is moved into the freezing tower.



NEW warehouse facility has four units, uses economical quonset structure. Ease of approach, expansion space are plant assets. Plant location in naturally dry area permits outside stacking of crates until used.

WAREHOUSE WITH FRESH TWISTS

Boost is given to science of proper cold storage by Cashmere Fruit Growers' striking new operation

WASHINGTON STATE'S Cashmere Fruit Growers Union suffered a disastrous fire a year ago—but it bounced right back by planning and building a bigger and better plant.

Hailed as one of the country's finest, the cooperative's new fruit warehouse includes many innovations in design and operation. Built of concrete for a completely palletized operation, the plant consists of two cold storage buildings, a packing building, and a segregation or common storage building.

Ideas for optimum precooling and storage facilities jelled in the following noteworthy improvements:

- **Scientifically located ducts that aid air circulation.**
- **Superior floor, wall and roof insulation that saves refrigeration.**
- **Centrally located instrument for reading storage room temperatures.**
- **Automatic defrosting system that features dual water spray.**
- **Unique floor heating that keeps packing crews comfortable.**

The cold storage buildings are each 120 ft. wide, 240 ft. long, and 20 ft. high to the bottom chord of the trusses. The packing building is likewise 120 by 240 ft. long, but here the building has only 14 vertical feet below the bottom chord. The segregation building, located between its two companion structures, is 70 ft. wide and 240 ft. long and also measures 14 ft. to the truss.

'Couples Gage Insulation Values

Floor insulation in the cold storage building is 9 in. of pumice concrete over 2 ft. of well drained gravel. Topping the pumice is a 5 in. reinforced wearing floor.

Tests to determine insulation character have been extensive. A series of thermocouples spotted under the floor and in the earth below indicate a temperature differential of 30 deg.

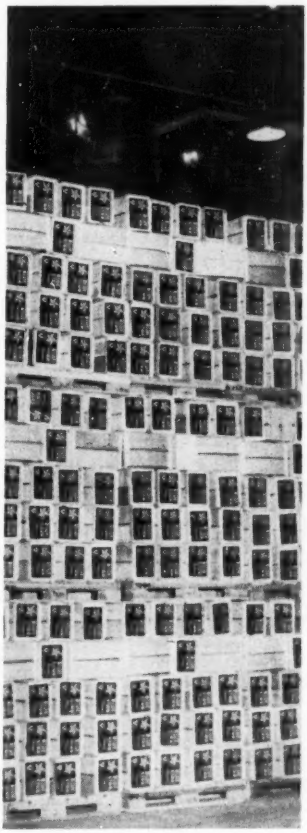
Sidewall insulation is composed of 4-in. sheet cork placed directly against concrete walls and supported by nailing strips placed in forms before the walls were poured.

Roof insulation is 4 in. of cork placed over 2 by 6 in. sheathing. A built-up roof rests directly on this insulation. Great care was taken to get cork around the ends of trusses and at the junction of roof and sidewall.

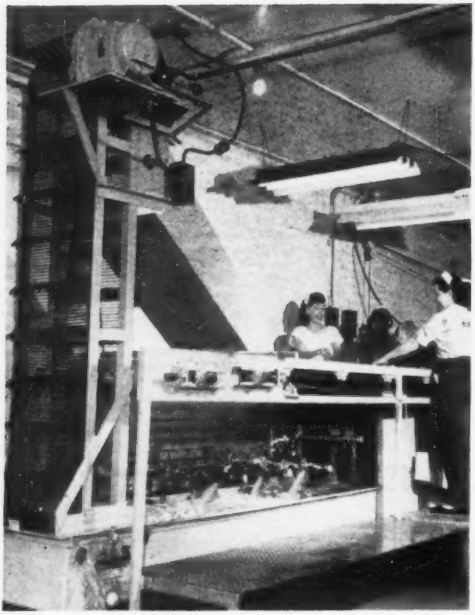
Ducts Specially Placed, Adjustable

Excellent air distribution is provided by ducts specially located in the trusses. Velometer tests with D'Anjou pears piled 15 boxes high (3 pallets) have indicated an air velocity of 50 cfm.

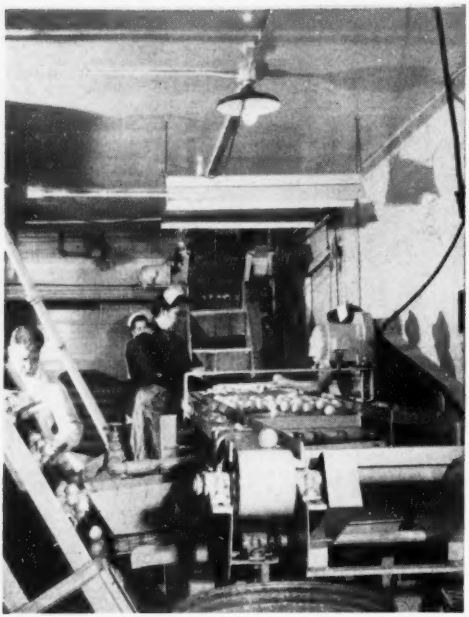
(*Turn to page* 212)



FULL 20 free feet are offered for cold-storing pallets. Note portion of refrigeration unit and duct outlet above trusses (top).



1 DUNKED in detergent and washed forward, fruit is raised and chuted to inspection table, where blemishes are pared, unsound fruit discarded.



2 SMALL CONVEYORS carry off rejected fruit, while sound fruit is carried to shaker (center), rinsed, and moved upstairs by elevator (left).

Quickest to Quality

Proper Materials Blended Right

Technic is attested by perfected-mix process that banishes previous shortcomings in flavor of frozen citrus purees. New method was developed by Coast producer, with able "assist" from USDA lab

JAMES S. LAWLESS
President, Frosted Fruit Products,
Los Angeles, Calif.

Acceptance of frozen citrus purees by industrial users was originally retarded—due to the development of off-flavors after the product was defrosted.

The USDA Fruit & Vegetable Laboratory, in Pasadena, Calif., discovered that these off-flavors were caused (1) by improper selection of fruit and (2) use of equipment that did not thoroughly blend juice, pulp, fruit cells, and natural citrus oils.

Now, however, Frosted Fruit Products, Los Angeles, aided by information supplied by the USDA Fruit & Vegetable Laboratory, has developed a new process which not only eliminates off-flavors but gives the industrial user a product equal to fresh puree. Utilized are special stainless-steel presses.

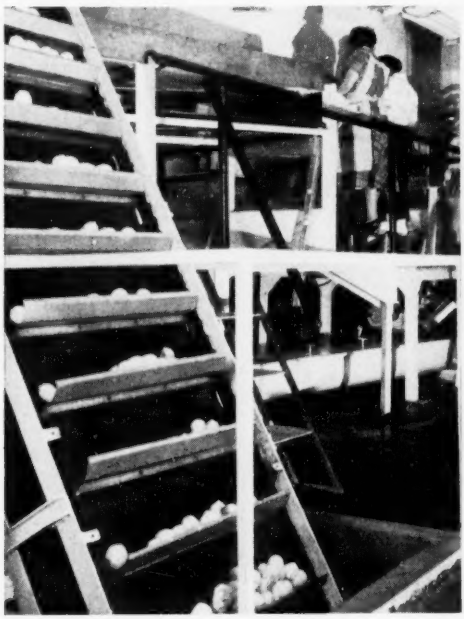
Bakeries, ice cream, and preserve manufacturers used more than 1,000,000 lb. of citrus purees in 1949 and increased their usage during 1950. One ice cream manufacturer produced more than 750,000 lb. of sherbet made from orange puree.

There are only five presses, anywhere, now being employed for this process, and the three used by Frosted Fruit Products have been redesigned so as to permit closer control over the amount of oil extracted from the fruit.

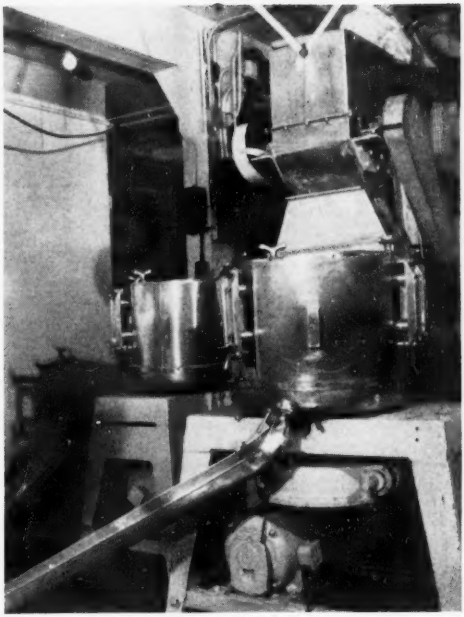
These presses will produce a citrus puree with less than 1.5 percent of oil, and normal periods of low-temperature storage show no appreciable loss of vitamin C.

Only sound, ripe fruit is used in the manufacture of orange and lemon purees. Medium to small sizes of citrus fruits are preferred because of the better yield and quality of the juice.

The fruit is first dumped, from 60 lb. lug boxes, into a detergent solution, where it is dunked and also moved forward by paddle-wheels. The final paddle-wheel scoops



3 AFTER LAST inspection on 2nd floor, fruit is moved into slicers and thence to presses. Screw conveyor (center) carries off waste material to peel bin.



4 ENTERING SLICER (top right), fruit passes through 32 saws, then drops to presses (center). Next, it is chuted (bottom center) down to mixers.

it from this section into the clear water rinse, where it is pushed ahead by high pressure sprays.

It is then elevated to the inspection conveyor, where the stem-ends of the fruit are cut off. Operators also pare from the fruit any discolored spots caused by limb-burn, smudge pots, and the like, thus eliminating the chance of dark specks appearing in the finished puree.

The trimmed fruit is then elevated to the second-floor, where it is given a final inspection before it is sliced for the presses. The operators at this station regulate the flow of fruit to the slicer by controlling, with a switch, the flow of fruit over the initial inspection conveyor.

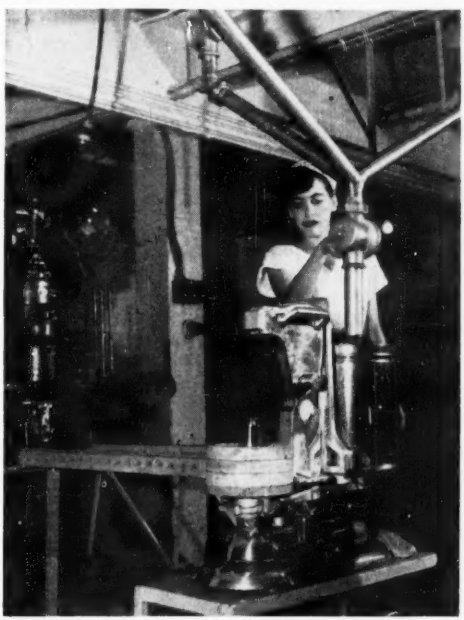
In the slicer there are two banks of circular saws (16 to a bank) and these revolve toward each other. The fruit that drops between them is sliced to a predetermined size acceptable to the presses, which are directly below. From the slicer, the flow of segmented fruit is distributed evenly by chutes to the presses.

Operating at high pressure, these rotary presses extract the puree from the fruit, which is then extruded through stainless-steel screens, of appropriate size mesh, into flumes that lead to the three 150-gal. mixing tanks. Predetermined amounts of sugar are added to the full tanks and mixed by slow speed agitators.

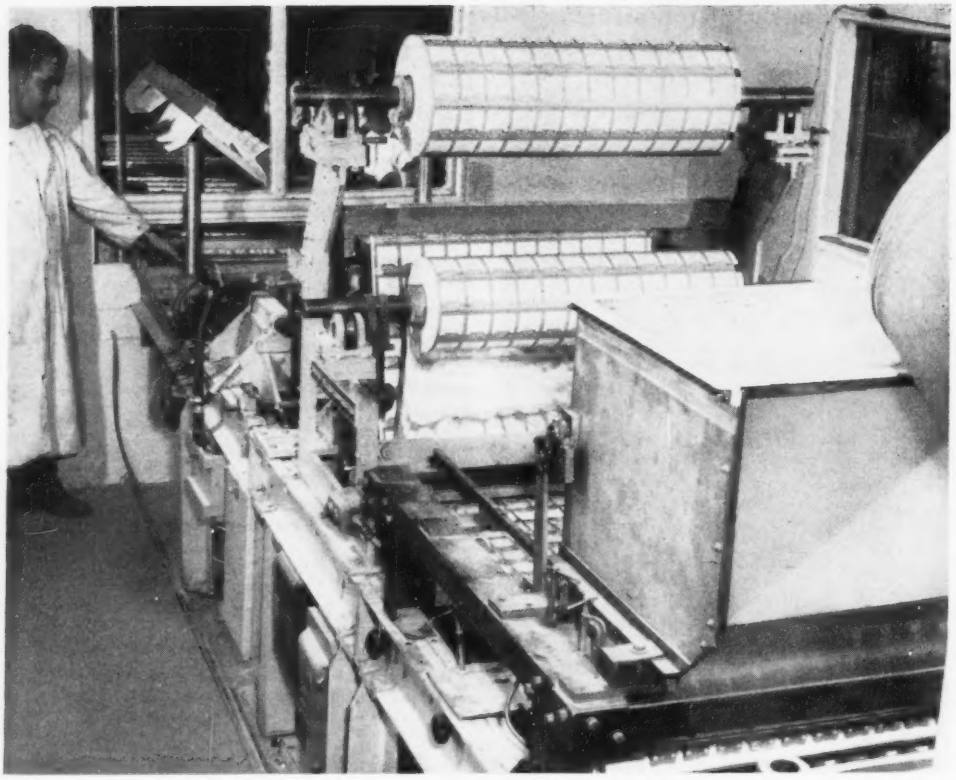
The finished product is then filled into citrus enamel-lined cans and immediately moved to the freezing rooms.

All equipment in the plant coming in contact with citrus juices is of stainless steel.

In addition to the citrus purees, apricot, berry (including cranberry), banana, nectarine, papaya, peach, pear, pineapple, and plum purees are produced for the ice cream, baking, and preserving trade. Recently these purees have found acceptance by the beverage trade for the manufacture of still-water fruit drinks.



5 FINAL STEP is to draw puree from mixing tank into enamel-lined cans of various sizes, after which the finished product is moved to low-temp storage.



THIS straight-line mass-packaging machine is now turning out 675 2.5g. packets of soluble coffee per minute.

Packages Dry Foods "Regimental" Style

New machine stamps roll-fed foil into pockets, fills them with product, and then forms 24 heat-sealed packets at a time.

JOHN V. ZIEMBA
Assistant Editor, "Food Industries"

Multiple straight-line filling and packaging of 2.5g. cup-serving packets of soluble coffee—675 per minute! This is the achievement of Mason-Keller Corp., contract packager of Roseland, N. J., who are supplying the QMC.

A second QMC-ration coffee product containing carbohydrates (dextrins and maltose) is also speedily made up by the company. Here, the packets are of 5g. size and are produced at the rate of 500 a minute. Still larger size packets are made at a slower rate. ■ **The special high-performance machine used can also be adapted to products, such as MSG, yeast, bouillon, sugar, salt, soluble tea, and also milk, lemon, and baking powders.**

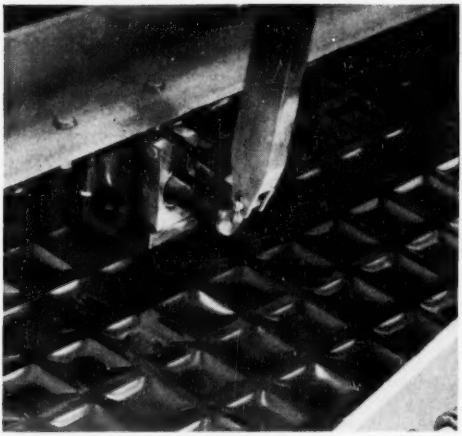
As indicated, the unit may be fitted to make packets in a range of sizes, according to product and demand.

Designed and built by M-K, the mass-production machine automatically fabricates two 26-in. widths of roll-fed aluminum foil into $2\frac{1}{8}$x$2\frac{5}{8}$x$\frac{3}{8}$-in. packets of soluble coffee or $2\frac{1}{8}$x3x$\frac{1}{4}$-in. packets of the coffee product having the carbohydrates.

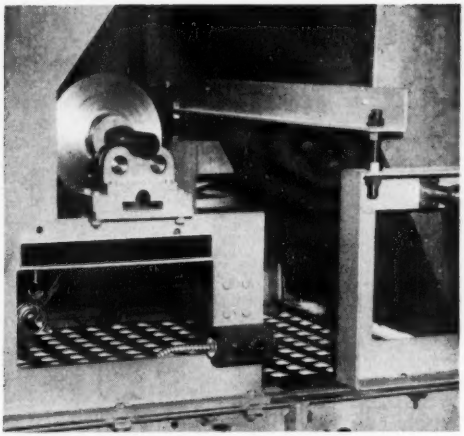
The machine receives a sheet of foil and stamps pockets into it. Next, the product is filled into these pockets, and leveled. Then a second sheet of foil is placed over the filled pockets and heat sealed, forming individual packets that are finally cut apart.

This new packaging of free-flowing powdered products—24 packets at a clip—is a radical departure from the conventional, single-line operations that call for rapid repeated handling of such materials.

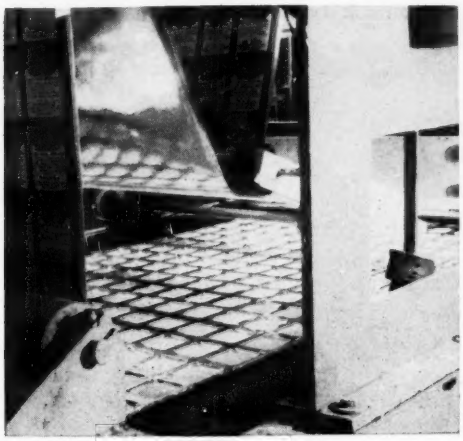
In respect to the multiple filling, however, there may be a comparison with the procedure on lines making mayonnaise, salad dressing, peanut butter, jelly, and cottage cheese. But such jars of liquid and semi-liquid products coming from the multiple-filling unit are delivered single-file to capping and labeling machines, whereas here the package is directly finished



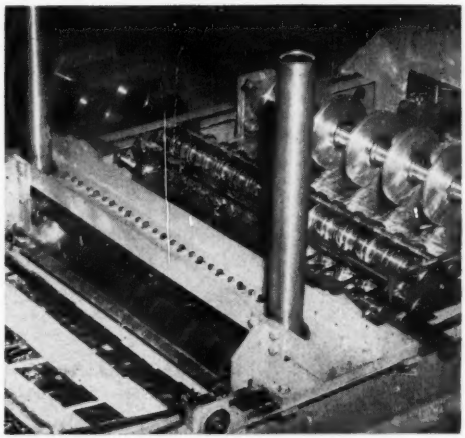
1 **POCKETS** are automatically stamped into roll-fed aluminum foil—12 abreast and 24 at a time.



2 **SOLUBLE COFFEE** is accurately weighed and filled (right) into preformed aluminum pockets.



3 **THERMOPLASTICALLY** coated foil (top) goes over filled pockets. Sealing then forms single packets.



4 **SLITTERS** (right) and guillotine knife (center) cut packets into individual units.

by the over-lay of the special heat-sealable foil.

The two coffee products are initially received from the manufacturers in 150-lb. fiber drums. After Mason-Keller has foil-packaged them, it ships the packets to other plants, where they are utilized in assembling the various QMC rations.

Eight Steps

Different gages of foil are used for top and bottom sides of each packet. Extensible aluminum foil (0.002-in. thick) is used for the bottom, preformed side. The face of the packet is made of 0.0015-in. foil, which is printed on one side and coated with a thermoplastic material on the other.

Packaging the new way is an eight-step operation:

1. Bottom web supply of foil is fed from a 200-lb. roll to the preforming station, where pockets of the proper size are formed—12 abreast or 24 at a time for the soluble coffee.

2. Preformed web of foil passes through the filling station, where portions (2.5g. of soluble coffee) are volumetrically weighed and deposited into the pockets.

3. Product is leveled into pockets as the preformed web of foil travels under a rotary roll.

4. Top web of foil is fed from another roll and placed over the preformed pockets.

5. Top and bottom webs go to the heat-sealing station, where a flat (rather than a crimp) seal is made by a Teflon-coated unit. Sealing takes place in a fraction of a second under high pressure at 375 deg. F.

6. Electric eye registers both top and bottom webs for slitting and cutting into packets.

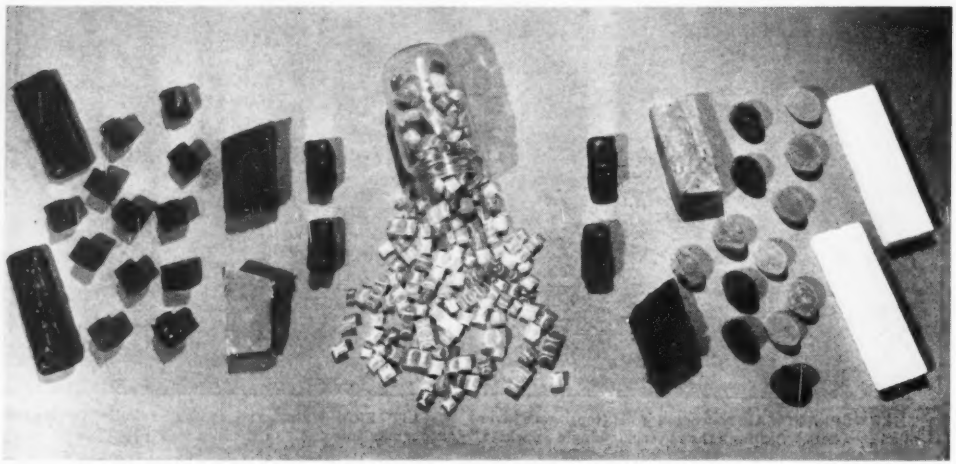
7. A series of rotary knives slit the double web lengthwise into single rows of packets and trim excess foil from the ends of the webs.

8. Individual-packet units are cross-cut from the single rows of packets by a guillotine knife.

Dividing plates can be inserted into the hopper of the filling unit so that more than one product can be packaged at the same time.

Fortified Confections Are Prominent in This SA-3 Arctic-Survival Ration

Civilian Sweets Are Big Field for Enrichment



How to Vitaminize Candies

Detailed here are various fortifying agents, their characteristics, and ways to use them in enriching chocolate bars, fudges, and caramels . . . Author refutes specific criticisms of candy, showing it rates high as good food

Part I

ALFRED E. LEIGHTON

Consulting Food Chemist and Candy Technologist, Riverdale, N. Y.

Quite recently, speakers from the QMC have called upon the candy industry to introduce new types of confections to bolster the morale of the service man. This request is not difficult to meet, for many different and interesting combinations of various known types may be devised—some of them real mouth-watering confections. ■ **But new candies may not be enough.**

If a service man bails out of a distressed plane, or resorts to a life raft

after his ship has blown up, or is surrounded by the enemy and separated from his commissariat with only his rations to fall back upon, then those rations or the candy portion represent a survival item, a morale builder, or even a clutch on life.

It is under such conditions that the importance of augmenting the nutritional value of the candy ration becomes apparent and desirable.

The need of vitamins for the body has been established. And while some vitamins (the oil-soluble) are stored in the human or animal liver and such storage will carry over for the needs of limited periods of deprivation, the water-soluble vitamins, however, need daily replacement because they are not stored in any organ.

Belief Changed

At one time it was commonly held that if a diet made up of carbohydrates, proteins, and fats provided adequate calorie value, it was complete. Our newer knowledge of nutrition, however, has changed this belief and shown it to be incompletely true.

It is not enough that proteins be present in proper amount. The nature of the proteins is important, for they must yield the right kind of amino acids needed by the body to maintain health. Not all proteins provide the essential amino acids. Proteins derived from animal sources are more valuable than those of vegetable origin. The latter break down into amino acids that have to be supplemented by others from animal sources. And if they are not supplemented, they are incomplete for the needs of the body in the maintenance of health or even life itself. In addition to the foregoing, the diet must also provide certain minerals.

Now let us consider candy and how well it serves nutritionally: *First,* it contains adequate amounts of energy builders in the form of carbohydrates —sugars and such. *Second,* it is composed of fats such as cocoa, creamery, and vegetable butters that are common constituents. And *third,* it possesses animal and vegetable proteins, the former provided by milk in its various forms and egg albumens.

Soya products, when used, provide vegetable proteins as do nuts. Milk solids and nuts provide vitamins and minerals such as calcium and phosphorus. Chocolate also furnishes mineral matter. Nuts and fruits supply some vitamin values.

It is therefore apparent that candy is by no means as barren of nutrients or as imbalanced as some critics would have us believe. It is true that hard candy chiefly consists of carbohydrate, pure and simple, but even this is being overcome by the growing practice of filling hard candy with fruit jams and nut pastes. Even butterscotch, as an example of hard candy, can and often does contain much fat in the form of creamery butter which, in turn, contains vitamin A and some mineral matter if it is straight or unprocessed creamery butter.

None of our foodstuffs is a perfect food—one capable of supporting life and maintaining health indefinitely when used as a sole diet. There are some foodstuffs that may approach that standard, but approach is not enough. So if our best foods have to be supplemented with others in order

Debunks Claims Against Candies

Lest the reader draw any erroneous conclusions that there is anything wrong with the present nutritional status of candy, let me hasten to explain that such is not the case. On the contrary, the nutritional value of present-day candy is on a high plane. Candy in general contains not insignificant proportions of every one of the essential group of foodstuffs that nutritionists deem necessary.

Army-sustaining rations for wartime rehabilitation purposes among malnourished populations in the wake of war, or following famine and similar restrictive conditions, are the special purposes for which fortified candies are indicated. The accompanying article informs the reader on the best ways to incorporate vitamins in candies and it is expected that the methods described will represent short cuts and save time for those candy manufacturers who plan to produce, experimentally, items of augmented nutritional value, either for commercial sale or for submittance to the QMC or to other interested government departments.

From time to time in the past, candy has been the target of detractors. Some members of the medical and dental professions have inveighed against candy on the score that the regular consumption of sweetmeats was responsible in great measure for the prevalence of dental caries, especially among the children. And occasionally, candy has been criticized on the score that it is nutritionally unbalanced.

Your author has yet to read of any series of carefully controlled experiments, the results of which have produced a weight of incontrovertible evidence sufficient to pin down the issue and be adequate to convince an impartial court of scientific inquiry on the validity of the conclusions drawn.

On the other hand, there is evidence to the contrary—namely, that when the nutritional background of the individual is normal, good, or excellent, the incidence of dental caries is lessened, and it is not any heavier than that associated with the ingestion of other foods.

In medicine, when there are many and various cures for a single disease entity, one is justified in thinking that the disease may have more than one origin. Or, to use the physician's term, it has various etiologies. All of which means that its exact origin is unknown. By the same token, when one experimenter blames candy for encouraging the growth of acid-forming mouth bacteria, which subsequently attack the teeth, another accuses deficiencies of calcium, phosphorus, vitamin D (one or more of them simultaneously). Still another blames deficiencies of certain hormone secretions, and a fourth may condemn poor mouth hygiene or lack of fluorides in the food intake. Accordingly, the innocent and thoughtful onlooker will conclude that the whole subject is confused and that no one has come up with the cause, beyond peradventure of doubt, for the existence of dental caries.

Last, but not least, it would be just as reasonable to blame food residues derived from such starchy items as bread and potatoes or other carbohydrates left in the mouth as it is to blame sugar or candy for dental decay. They are all capable of fermenting and producing acid in the mouth if left undisturbed.

One nutritional authority has indicated that as a result of certain experiments, he has found that the phosphoric acid of certain beverages is capable of attacking teeth. Regardless of origin, mouth acids are going to do a good job of cavity production if given time to act. So why blame candy?

A little mouth hygiene or the use of your extra-fancy smoked brand of dentrifice, whether you lean to the ammoniated, the magnesiad, or the straight sodium bicarbonated, is commendable, but it is not all things to all men, or all decaying teeth. The subject of the causes and cures for dental decay are ripe for the not too tender mercies of the debunker. This just about brings us up to date on culpability aspects of confections, regarding their nutritional value or lack of it as a prime cause of dental caries.

—A.E.I.

to make up a complete diet for the maintenance of health and life, candy as such should not be pilloried or scorned as an item in the diet. It has its place there, and an honorable one, withal.

Some Significant Vitamins

While there are some fifteen or more of these accessory food factors known to play a part in nutrition, candy manufacturers need not be concerned with more than about six vitamins at most. Of these six, there are the oil-soluble vitamins A and D and the water-soluble vitamins B_1, B_2, niacin, and ascorbic acid.

Minimum daily requirements for an adult have been established for most of these vitamins, being set up as follows: For vitamin A, 4,000 I.U.*; vitamin D, 400 I.U.; vitamin B_1, 1 mg.; vitamin B_2, 2 mg.; and vitamin C, 30 mg. The figure for niacin is not established, but it usually appears at a 10-mg. level.

Up to this time, there is only one item among QMC requirements that calls for a vitamin addition—vitamin B_1 at quite a low level. It is the writer's understanding, however, that vitamin C would be an interesting addition to candy for QMC requirements. Whether the QMC would be interested in having a candy item that contained all the six vitamins mentioned, and at what level per unit weight of candy, is unknown at this time. However, it is up to the individual manufacturer, in making his experimental candy items, to include one, or more as he chooses of the six vitamins and to offer these confections on approval to the QMC for tasting and testing.

It might be asked, "At what level should the respective vitamins be added?" Here, neither a precedent nor a directive exists. But since the underlying purpose of fortification is for survival rations and kindred uses, it would be entirely sensible to use the level of the minimum daily requirements and to add that amount to each 1 or 2 oz. of candy.

Since many bar candies at present weigh in the neighborhood of 1 oz., a soldier who consumed a bar of candy enriched at the ounce level would be sure of getting his minimum daily requirement of the six vitamins, regardless of what else he consumed. At the same time, the adoption of the ounce, or the bar weight, as the unit would simplify subsequent factory procedures.

The addition of vitamins to candy is not a complex operation, but it does call for the exercise of care and common sense. The care comes in when one considers that the vitamin charge has to be weighed carefully for each batch, which must be of known weight. The enrichment material must be added at the right stage of processing, otherwise the level of vitamin per unit weight will not be as intended.

There is no room for careless or haphazard operation when vitaminizing foodstuffs. The Food & Drug Administration has certain regulations governing such additions. And label claims at all times must be truthful and capable of being substantiated when the foodstuffs are assayed.

Candies That Can Be Enriched

Practically all candies as we know them can be enriched. Some, however, are better for this purpose than others, being easier to fortify and less prone to suffer losses in vitamin value during processing.

Several vitamins are sensitive to processing. For example, vitamin A is sensitive to oxidation. So, too, is vitamin C. Vitamin B_1 is inclined to be thermo-unstable under certain conditions. Therefore, processes and candies have to be adapted with these characteristics constantly in mind.

One who has seen a child, or some adults for that matter, in Europe place a bar of chocolate between the halves of a roll of bread and consume the same with gusto and evident relish cannot doubt the acceptability of chocolate as a vehicle for vitamins. Chocolate undoubtedly excels in acceptability for the purpose.

The easiest item to enrich is bar chocolate, using the oil-soluble vitamins A and D in particular. But bar chocolate is also a good vehicle for the water-soluble vitamins, if they are properly dispersed. Chocolate has always seemed to the writer to exercise a protective effect on vitamins that have been added to it, and to retard losses from deterioration.

Hard candy is a good vehicle for vitamin C, and the acidity of ascorbic acid will add to the zestful effect of the fruit acids that are normally added when this type of confection is fruit flavored. Caramels and fudges may also be enriched. Nougats and marshmallows may not be suitable for the addition of vitamins that are sensitive to oxidation, because aeration may be expected to bring about some losses of the vitamins. However, these losses can be determined and allowed for in any set of operating conditions.

Pectin jellies may not be a good vehicle for vitamin C, not because the vitamin would be harmful, but because pH alterations produced by the ascorbic acid additions might act detrimentally in the setting of the jelly. As is well known, pectin jellies work best between somewhat narrow pH values.

It would, therefore, seem advisable to check the effect of the resultant pH values of the mixture before proceeding on any large scale processing. The usual citric acid additions could, if necessary, be manipulated experimentally to produce the right kind of jelly. As far as the other vitamins are concerned, they could be incorporated without any anticipation of difficulty.

What has been said about pectin jellies does not apply to starch jellies. The pH of starch jellies is not too critical.

Getting Down to the "How"

The almost invariable pre-requisite for incorporating vitamins into candy is the preparation of a suitable pre-mix. The vehicle for the pre-mix should either be a part of the ingredients of the formula, or some substance that is miscible with it.

In the case of solid bars of molded chocolate, a suitable weight of chocolate can be used as the vehicle for all vitamins. And by taking a weighed portion of this concentrated pre-mix, its vitamin content will be known. Then, the weighed pre-mix can be blended in the tempering kettle with a definitely known weight of chocolate and used as required.

Vitamins A and D are available in commercial form as an already-mixed concentrated solution of known standardization. Both vitamins can be obtained dissolved together in a ratio of 10 to 1—that is, 10 units of A to 1 unit of D. And where it is intended to adhere to the minimum daily requirement, as specified, such a solution is very convenient.

Vitamin D is stable, hence a safety margin of 20 percent is scarcely necessary. But here the D is present with the unstable vitamin A in a concentrated solution, and thus 20 percent excess of A gives a similar excess of D. Separate solutions of each of the oil-soluble vitamins would avoid excessive use of D.

Synthetic Vitamin A Gets Nod

On the other hand, if preferred, both vitamins A and D can be purchased separately as concentrates. Synthetic vitamin A palmitate, the biological equal of natural A, is the preferred form when this vitamin is separately purchased as a concentrate. Reason: It is virtually tasteless.

Regardless of how it has been processed, the natural vitamin always tastes and smells of fish oil. And any candy that smells or tastes of fish oil will never get to first base with the QMC acceptance panel.

Vitamins B_1, B_2, niacin, and ascorbic acid are commercially available in pure

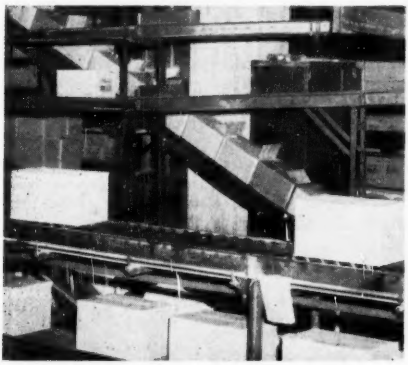
(*Turn to page* 210)

* Same as U. S. P. unit.

A SPECIAL FOOD INDUSTRIES REPORT

BELT CONVEYOR: Speeds raw sugar

SLAT UNIT: Ups meat output



ROLLERS: Simplify beer-case handling

LIFT TRUCK: Stacks canned goods easily

Modern Materials Handling

Gives New Spurt In Processing

Put the proper 1951 "movers" to work—the right equipment in the right job —and you'll quickly save on handling, speed processing, reduce inventories, and improve working conditions, all with more efficient use of space

F. W. McCARTHY
Assistant Editor, "Food Industries"

Improved handling is the greatest expedient in cutting costs and increasing output in the food industry. Further, through use of advanced materials handling equipment, your plant operations can be made safer, easier, and more efficient.

Look at your own payroll and you can quickly determine just how large or small a handling operator you are. Some food plant payroll figures would indicate that the major operation is materials handling. So, the question arises: "How much can we save through better materials handling?"

But be sure, first, that you are considering *all* the possible benefits—product flow, faster processing cycles, lower inventories, greater utilization of space, speedier movement

of finished goods, and improved working conditions for employees.

To help you in gaging your "mover" needs a special checklist is included with this article (page 109).

Toward Goal

Continuous processing—the ultimate goal of every food processor—can be achieved only through mechanized handling of materials. Mechanization of the materials handling unit operation is one of the major steps in achieving the fully automatic plant—the pushbutton plant of tomorrow.

Development of the automatic plant, also promises long range operational and also social benefits. The trend to pushbuttons can extend the productive period of your skilled, veteran workers, whose judgment, dependability and mental faculties are often improved at the age when they become less able to undertake the execution of hard manual tasks.

In the food processing industry, it is estimated that 30 percent of the total plant payroll—the payroll for direct, productive labor—is chargeable to materials handling. And, when you consider that the food industry handles billions of pounds of materials per year, it is apparent that the fastest and least expensive manner of handling is a "must" for efficient operation.

Practically every type of materials handling equipment is employed in some phase of the industry. For even in individual plants, the factors involved in the determination and analysis of a materials handling problem will vary over a wide range. Materials may be received at the plant in bulk and then leave in small bottles, cans, or packages. In some plants these materials enter as soft, perishable, small individual items, such as tomatoes in a cannery or grapes in a winery, and then leave in a case, part of a pallet load of such cases filled with cans or bottles.

In the brewery, the problem will initially entail handling of bulk granular materials, such as malt; later the movement of bottles, cans and cases.

In bakeries, materials to be handled will run from flour, a finely ground pulverized material, to a paste, then to a light, individual wrapped soft solid, the loaf of bread itself.

In sugar refineries, the material may be received in bulk or in heavy bags (325 lb.). Before leaving the plant, the refined material will have to be handled in units as small as 1-lb. packages, or in some instances even smaller, as the cubes or blocks used for individual servings.

In the dairy industry, too, the use of various solids movers is required at both the receiving and the shipping ends of the plant. For movers must be provided for handling both the empty and filled containers. Believe it or not, Borden's employs an air conveyor to transport cheese at one stage of the process in its plant at Dixon, Ill.

Many Movers for One Item

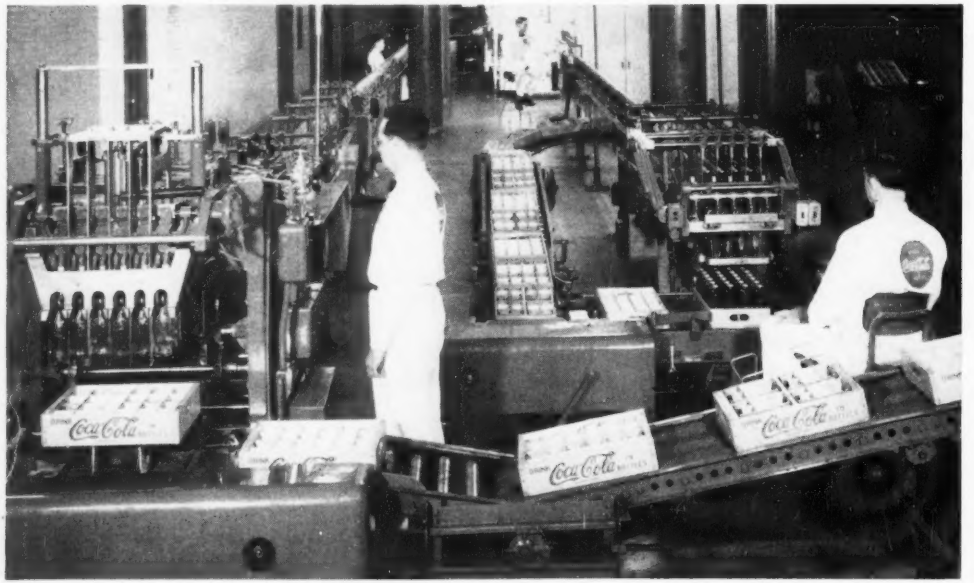
The great variety of "movers" that can effectively be employed in the handling of a single food product is illustrated in the raw sugar operation at Port of Hilo, Hawaii.

Hauled from the plantation by *truck*, sugar is first weighed. Then an extensive *belt* conveyor system carries it up a series of inclines to a horizontal *belt* conveyor system running over four 10,000-ton steel storage tanks. Raw sugar consolidates in storage, so it is reclaimed by a *clamshell bucket* depending from an *overhead movable crane*. From the bucket, sugar drops into central *discharge tubes* made up of 6-ft. sections of steel pipe.

At the bottom of the tubes, another *belt* system carries it to a long *conveyor* running parallel to the dock. *Belts* on movable *gantries* pick up sugar from the main belt, *chute* it to a centrifugal boat *trimmer*, which spreads it uniformly in the *ship's* hold.

The incoming operations alone at the canning plant of the Hawaiian Pineapple Co., in Honolulu, are an ex-

SOFT DRINKS



FAST, SAFE, EASY. Here, automatic uncaser (left) removes bottles. Cases travel via pusher bar, roller, and belt conveyors to dumper, then to automatic caser (right). Bottles (background) move on flat top chain conveyors. (Coca Cola Bottling plant, Indianapolis)

WHAT IS *YOUR* PLANT'S MHQ*?

THIS HANDY CHECKLIST will give you the "moving equipment" rating of your own plant. First, run your eye down these columns and check with your pencil the various materials-handling units you now employ. Then—

1. Concentrate on the *unchecked* units, keeping your full operation always in mind. Are you missing several good bets in failing to use some particular devices? Which specific units promise you notable new improvements?

2. Now double-check your observations by going through the accompanying Report—with special attention to the advanced operations revealed at outstanding plants. Do these pacemaking practices tip you to still other units promising your company additional engineering benefits?

3. Finally, run back over the materials handlers you now use—the ones you checked here. Do any of these need replacement as over-aged and obsolete? Will newer models or types do your moving better?

If your honest answers to these questions prove you've really "kept up front" in using these many efficient pieces of modern handling equipment—then your plant has a high MHQ. If not, you should think seriously about boosting your score—following the pointers given here.

*Materials Handling Quotient

Conveyors

- Apron ☐
- Belt, Fixed ☐
- Belt, Portable ☐
- Bucket ☐
- Chain ☐
- Chain-Trolley ☐
- Chute ☐
- Drag ☐
- Flight ☐
- Flume ☐
- Monorail ☐
- Platform ☐
- Pneumatic ☐
- Redler ☐
- Roller-Gravity ☐
- Roller, Portable ☐
- Roller-Powered ☐
- Roller-Spiral ☐
- Scraper ☐
- Screw ☐
- Slat ☐
- Solids-Pump ☐
- Tray ☐
- Wheel ☐
- Vibrating ☐
- Zipper ☐

Hoists

- Chain ☐
- Crane ☐
- Dumper ☐
- Hydraulic Platform ☐
- Magnetic Lift ☐
- Skip ☐

Industrial Trucks

- Four-Wheel Factory ☐
- Hand-Lift ☐
- Powered-Hand ☐
- Powered-Lift ☐
- Straddle ☐
- Two-Wheel Stevedore ☐
- Trailer-Tractor ☐

Handlers

- Ball Transfer ☐
- Can Unloader ☐
- Case Unloader ☐
- Lug Box ☐
- Pallet ☐
- Pallet Loader ☐
- Portable Bin ☐
- Retort Loader ☐
- Skid ☐
- Table Leveler ☐
- Unscrambler ☐

cellent example of the use of modern materials handling equipment.

Pineapples have been handled at this plant at the rate of 4¾ tons per minute. They are first delivered to the production lines by *straddle trucks* which carry 7-ton *bins*. *Hydraulic tilters* empty the bins onto *slat conveyors*. *Gravity rollers* carry the empty bins across the dumping station to be picked up for return to the fields. Pineapples travel to *graders*, then drop to 48-in. *belts* which deliver them into the cannery.

Inside the cannery, graded fruit passes to its respective *belt-distribution system*. Control of these belts feeding the preparation lines is from a central station. Automatic *deflection arms* divert pineapples from the belts into *chutes* leading to machines that core them into cylinders.

Case Histories of Savings

What has been accomplished in effecting operating savings by placing emphasis on mechanized handling will now be brought out by detailing of specific plant installations:

Roller Conveyors Effect Savings

In the bottling plant of I.O.A. Foods, Cedar Rapids, Iowa, hinged two-way roller conveyor sections are employed in the truck loading area to permit both unloading and loading from the same locations. When these sections are in the "up" position, cases of filled bottles roll out to the truck loading section. When in the "down", or unload, position, they discharge onto a live "roller" conveyor, which takes the cases of empties through a wall and under the first floor directly to storage areas in the basement.

Slatted Unit Ups Output 25 Percent

Through the use of a slatted stainless steel conveyor in the boning department, Esskay, at its Baltimore meat-packing plant, has greatly lowered labor costs.

By reducing the number of handlings formerly required in boning hams, this system has increased productivity about one-quarter. And at the same time, the amount of floor space needed has been halved.

Formerly, the workers did the boning on large tables, having to get the cured hams for themselves from nearby vats. After boning, they placed the hams in similar vats, later to be hauled to other workers who tied the hams before they were packed into ham molds or rectangular or pear-shaped cans.

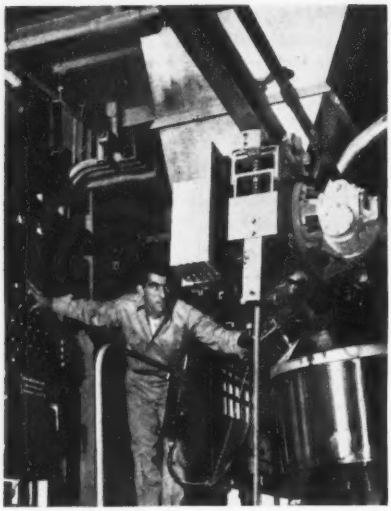
Now, however, handling is simplified on a conveyorized boning line that delivers cured hams directly to cutters and carries away the boned ones. By using this system, production records have been materially improved.

This line has another plus-factor—flexibility. Depending upon the flow of hams, it can operate with a minimum of two or a maximum of eight cutters. Furthermore, it "doubles" as a beef-boning line. On it, cutters prepare the trimmings for the sausage department, also make the various corned beef cuts.

Cuts Man-Hours 75 Percent

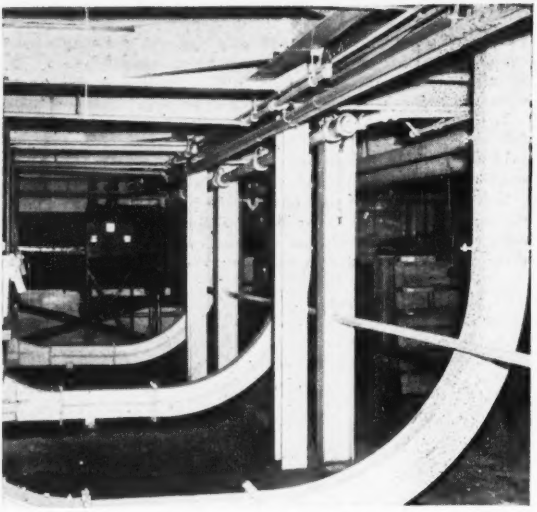
In a new food plant designed by Ford, Bacon and Davis, Inc., New York City firm of engineers, flour, the principal ingredient used, is delivered directly from the nearby mill by pneumatic conveyor. Going first into storage bins, it is later taken by screw

DESSERTS



MONORAIL speeds movement of proportioned ingredients in production of Jello. (General Foods' San Leandro, Calif., plant)

BAKERY PRODUCTS



REDLER CONVEYOR provides a sanitary handling system for delivery of blended flour from bins to sifters in this recently modernized plant. (Omar bakery, Columbus, Ohio)

conveyors to the process. All manual handling is eliminated. On a daily consumption of 100 tons, this installation saves 13 men.

When materials must be received in bags or drums, the preferred method is to convert to bulk as close to the receiving point as possible. Older methods may require as many as 1¾ man-hours per ton of material handled, while the new methods may reduce this to as little as ½ a man-hour per ton.

In a recently completed plant, bagged dry ingredients are unloaded onto pallets and moved by industrial lift trucks directly to a central feed-in point. Here, the material is dumped from the bags into the conveying system that delivers it to the ingredient storage bins, ready for the process requirements. As for the liquids, those in drums are dumped at a central point. The rest, received in tank cars, are pumped to ingredient tanks ready for use in the product.

Compared with the operation which this system superseded, in which bags and drums were hand trucked to the point of use, these newer methods saved 19 men.

Air Conveyor Cuts Labor 80 Percent

By installing an air conveyor for the handling of grain and malt, Terre Haute Brewing Co. has not only cut operating costs, but has also improved plant sanitation.

For years the brewery bought carloads of malt and cereal in bags, which were unloaded and trucked to the elevator by hand, lifted to the top floors of the brew house, and dumped into intermediate storage bins or stacked in warehouse space. Today, malt or grain is shipped in bulk and unloaded by an air conveyor system, which lifts the grain by suction to a distributing hopper at the top of the brewhouse. From here, the grain flows either to intermediate storage bins or to one of two 20-car capacity steel tanks. Grain or malt from the steel storage tanks is drawn into the brewhouse by same air conveying system.

The system is dual and interlocking. Cars can be emptied at the same time that grain is drawn from the steel storage tanks. Moreover, grain and malt can be transported simultaneously with no danger of mixing.

This mechanized system has advantages other than the saving in operating cost. The steel tanks have increased the storage capacity—a big advantage since it was thus possible to convert warehouse space into much needed processing space. Mechanical handling of grain has reduced labor required for unloading and warehousing by more than 80 percent and has saved processing labor, too. The present system is also much cleaner. The steel tanks are rodent proof.

Mechanization Lowers Inventories

In the same brewery, mechanized handling of finished products in the bottling house has also been made more efficient, bringing savings in operating costs. Objective of this mechanization was to reduce the need for in-plant storage of empty cases. This was accomplished through installation of an almost fully automatic, continuous production line to speed up inspection, washing, filling and labeling. Cases of empties can now enter the bottling plant and be washed, filled, capped and labeled on a 1½-hr. time cycle, and at a rate of 150,000 cases per day.

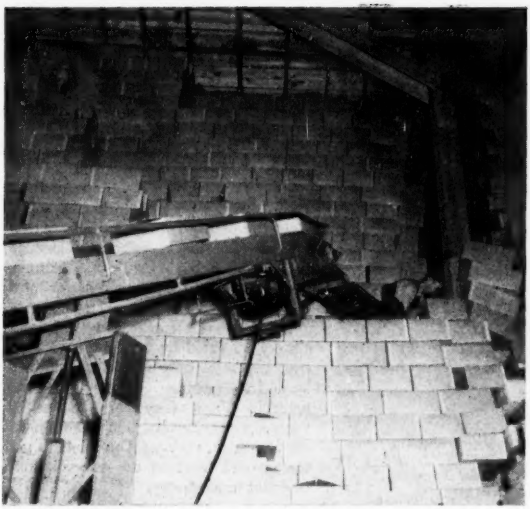
Also in the same plant, the multi-deck roller conveyor system — fully three miles long—operates almost automatically. Mechanical traffic directors ("traffic cops") prevent cases from jamming at intersections of conveyors by stopping one or the other line, depending on which is first to deliver cases to the intersection after an interruption. This system has decidedly cut bottle-house operating costs.

Savings Exceed $300,000

In a period of three months, June to August 1950, considerable savings have been made in the moving of brown milled rice through the Port of Stockton, Calif., by converting from bag to bulk handling, entailing the use of screw conveyors.

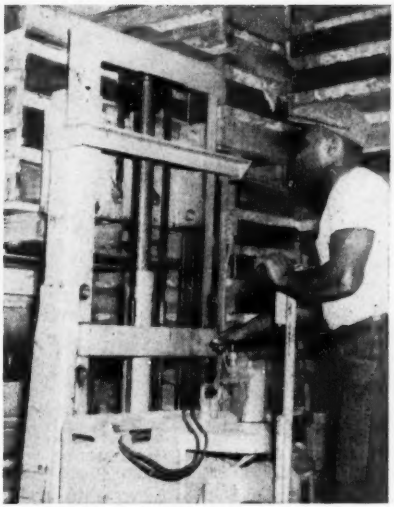
Savings in time accrued from the fast turn-around of trucks and rapid loading and unloading. Saving in sacks alone totaled about $200,000. And inland transportation saving amounted to about $108,000.

PEANUT BUTTER



PORTABLE BELT conveyor minimizes labor requirements in storing of cased goods. Maximum use of space is gained. (Warehouse of Cinderella Foods, Dawson, Ga.)

FISH



POWERED HAND TRUCK and pallets simplify, quicken, and sanitize job of handling cod fish. (J. W. Beardsley & Son plant, Newark, N. J.)

At the Sacramento mills of Rice Growers Assn. of California, milled brown rice was bulk-loaded into trucks and transported direct to the port. About 75 truckloads were delivered every day over an 18-hr. period to meet closely coordinated schedules.

At the port, equipment capable of bulk-loading 100 tons per hour was installed. Here is the way the grain was handled:

A special 15-deg.-angle ramp, 180 ft. long, was installed to permit two truck units to unload simultaneously into two screw conveyors. Totaling 135 ft. in length, these conveyors delivered rice to a pit, from which it was elevated by marine leg and carried to the hold of the vessel being filled.

Lift Trucks Effect Multi-Savings

At the plant of P. J. Ritter Co., Bridgeton, N. J., use of industrial lift trucks and palletizing has meant maximum warehouse space utilized, damage to cases minimized, and handling time and labor per case greatly reduced.

When the old method was in use it was possible to load-out 10,000 to 11,000 cases per day. Now, through use of industrial lift trucks, 50,000 cases can be handled per day. In the old way, a warehouse of 150,000-case capacity required more than three days to fill, using a stacking elevator and 15 to 16 hand stackers. An equal length of time was required to empty it. Now, less than three days are needed for one lift truck to fill or empty the 150,000 case warehouse. And with the help of two warehouse men, the outgoing cases can be loaded onto trailers at the same time.

Cut Costs In Half

Many hours of back-breaking labor have been eliminated at the Newark, N. J., plant of J. W. Beardsley & Sons, by adoption of modern unit-load materials handling equipment.

Savings have amounted to $1,500 per month since the new units were installed. Further, the tasks have been made easier and safer for the help, and sanitation is improved.

Cost of the materials handling has been reduced from $4.36 to $2.22 per 100 cases handled. Savings in 17 months have amounted to $27,000 on an investment of $13,500 for new equipment!

Fish Unloading Speeded

This plant's labor savings on salt-fish operations are outstanding. Formerly, unloading of a 30,000-lb. car required four men in the freight car, four men hauling hand trucks, one weigher, and six men, in the refrigerator stacking the fish. It required a day to unload the car.

The same work is now done in but half a day, with the four men in the car loading the pallets, one man with the power truck, and one weigher. No stackers are required in the refrigerator, since the electric truck does the entire job. The former method took 112 man-hours per car; the present method only 48. The new way saves $2,000 per year.

Having piled the fish in the refrigerators before skinning, it is necessary to remove skin and bone, then replace the fish in the cooler.

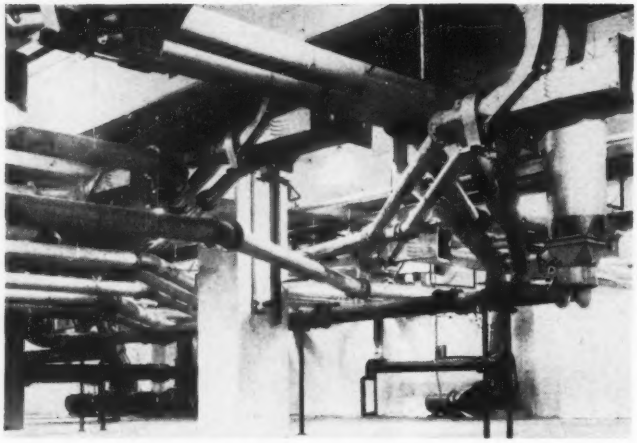
The former method required the handling of whole fish from the floor stacks onto trucks, hauling to skinning benches, skinning into barrels, towing the barrels back to the refrigerator, unloading the barrels onto the floor, and restacking to the ceiling.

Most of this work was done by professional skinners. These men spent, on the average, 4 hr. of a 9-hr. day doing materials-handling instead of skinning fish.

Today, a fish skinner takes a powered hand truck and within 5 min. has his pallet load of whole fish at his hand ready to work. He throws the finished fish pieces into a pallet box, which is returned to storage in the refrigerator. Instead of spending 4 hr. per day piling and unpiling fish and hauling, a skinner now does this work in 30 min. This is a saving of 3.5 hr. per day per man. Employing six such men steadily, 21 man-hours per day are saved—in dollars, a total of $5,500 per year.

Unit Loads in Bakery

The use of lift trucks and pallets for handling of ingredients at Fuchs Baking Co., South Miami, Fla., has



PNEUMATIC CONVEYOR lines transport grains both vertically and horizontally in "pushbutton" flour mill. (General Mills plant, Los Angeles)

effected appreciable savings in both plant space and labor.

Incoming materials are handled efficiently on pallets by gasoline-driven lift trucks. Carloads of bagged flour come in on a railway spur a short distance from the bakery. Bags are stacked on pallets, transferred by lift truck to a large flat-bed automotive trailer, hauled to the plant, and then unloaded and placed in the storage room by lift trucks. Barrels of milk powder and drums of shortening are also handled on pallets.

Two high-lift trucks—1- and 1¾-ton—do the handling work. These trucks stack flour 3 pallets, or 15 bags, high. When the job was done by hand, the stacks were only 10 high. So the new system saves one-third in storage space. Drums and barrels are now stacked 3 high, whereas they used to be only 1 high. Thus, there's a two-thirds saving in space.

Valuable In Maintenance

Versatility of the fork lift truck is worth the special consideration of every food processor.

The importance of this unit for rapid and economical handling of raw products and finished goods is well known and its advantages in warehousing are recognized.

But that's not the whole story. Its value doesn't stop there. For it can also perform as a first-rate maintenance tool—as a crane or hoist, a mobile anchor, a ladder, or a temporary scaffold.

Automatic Counting Saves 5 Men

Regulation of the flow of cases—empties coming in and full cases of ale and beer going out—has been attained at Haffenreffer & Co., Inc., Boston brewer, with the installation of a remote electric counting, number-predetermining system. Any food processor who handles case goods can adopt this efficient system.

Before putting in the system, the company had needed three men for counting outgoing shipments and two for keeping tab on empties coming in. But now, the shipping department gets automatic counts right in its office—through a special wired hookup to photo-electric counting units out in the plant. Thus, the old physical method of tedious, time-taking totaling by the five checkers is done away with.

Monorail Ups Blending Operation

In the new plant of General Foods, at San Leandro, Calif., the use of stainless steel conical shaped containers, moving via a monorail, has speeded the proportioning and blending of Jello. Loading of ingredients and movement of the cars to and from the mixers is under pushbutton control.

Drum Handling Made Easy

At the Coca Cola Bottling Co., plant in Indianapolis, a unique conveyor system has simplified the handling of syrup drums. Flavoring syrup is received, as at all Coca-Cola bottlers, in 50-gal. stainless steel drums.

In this plant, however, drums are brought to the plant on stake trucks which are raised to the second floor on an elevator. And here, the drums are rolled onto specially designed dollies that run on elevated tracks leading into the syrup room. For storage, sidings are provided from which the drums may be run to the syrup room.

In the syrup room, tracks follow the two longest walls, and on each track 15 drums are assembled and connected to stainless steel headers by plastic tubes. By alternating the gangs of direct-connected drums, a constant feed of syrup is maintained without pumps or storage tanks. Also, cleanup time is shortened, and chances for contamination are reduced.

Electric Hoist Speeds Operations

At the plant of John J. Felin & Co., Philadelphia meat packer, an electric hoist for feeding meat into a grinder has made the task much easier and speeded the grinding operation.

Mounted on an overhead track and simply operated by a pushbutton control, the hoist lifts a 200-lb. container load for feeding directly into the grinder. Thus, time for the task—formerly a shoveling job—has been cut one-third, making it possible to get the ground meat to the precook kettles that much faster.

Portable Stacker Effective

Through the use of modern materials handling equipment, tied in with automatic weighing units and the adoption of an in-plant inventory system, Cinderella Foods, Dawson, Ga., can detect and measure any loss of product in its manufacture of peanut butter. Not only has this company reduced product losses to a minimum but it has also lowered labor costs correspondingly.

Among the different types of materials handling units playing important roles at this company is a belt stacker. Portable and adjustable for height it makes feasible the roof-high stacking of filled cases of finished product. Thus maximum use of space is gained, and labor in the operation is minimized. The same unit is employed for the loading of outgoing trailers.

Telescopic Portable Belt

One of the most unique conveyors is the portable telescopic unit, such as used by Cushman's Sons, Inc., bakery in its outlet store in New York City's 34th St. subway station. How to get bakery goods from the street down to the retail store on the subway level, with as little labor as possible, was the company's problem.

The four-flight stairwell is 93 ft. in overall length. The conveyor, specially constructed, is mounted on four casters. It comprises a steel carriage upon which there are six 15½-ft.-long telescopic sections—one fixed and five extendable. These sections are equipped with a 12-in.-wide grip-type rubber belt that winds around a 24-in.-dia., manually operated reel when the conveyor is retracted for storage. The reel

tightens the belt to keep it from slipping while the conveyor is running.

Directly behind the pivot-section of the belt are two pushbutton drives. One runs the belt; the other operates the telescopic sections. Fully extended, the conveyor spans the 93-ft. of stairwell; contracted it measures 18 ft.

Hydraulic Truck Dumper

Substantial savings in time and labor are being made at grain mills through use of large hydraulically operated tilt dumpers capable of handling a truck and trailer assembly. The trailer can be dumped while still connected. The tilt is then lowered, the trailer back off, and the truck proper emptied. One of these units is in operation at the Northern California Rice Growers Assn. in Sacramento. The platform of this unit rises with full load in 40 sec. and lowers in 70 sec.

1 Man Instead of 4

Use of a special magnetic lift not only has effected labor savings, but has also doubled production on the labeling and casing lines of the Mor-Pak Preserving Corp., Stockton, Calif. The magnetic unit, operated by one man, has eliminated the backbreaking job of transferring bright cans from pallets onto the labeling line.

Formerly the manual job of a four-man crew, the system produced 300 cases of labeled cans per hour. The four men needed to transfer the cans onto the line were each paid $1.25 per hour, which for an 8-month operating period totaled $6,720.

The labeling-casing operation required another six men. This meant a total of ten men at an annual cost of $16,800.

By using the magnetic lift and increasing the line capacity from 300 to 600 cases per hour, labeling-casing time is cut in half. Eliminating the man at the unscrambler in this operation, along with the three on the transfer, makes a total saving of four men for the operation. Expressed in dollars and cents, this represents an annual saving of $11,760.

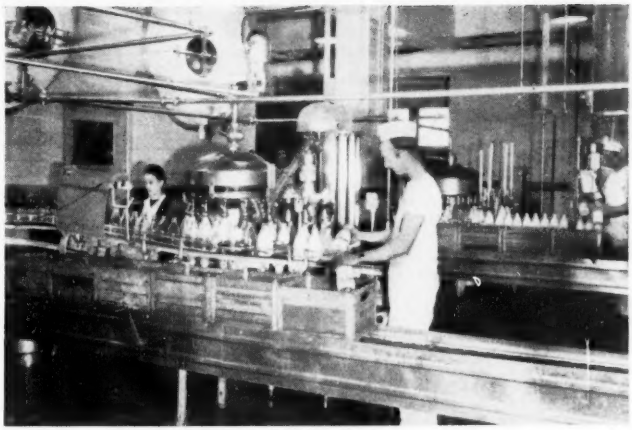
Automatic Devices Up Efficiency

Plant efficiency has been greatly improved in many operations at Fuchs Baking Co., South Miami, Fla., through the use of automatic devices which keep processing and conveying lines running continuously with little help from the operators.

For example, an automatic unit shuts off the mixer at a pre-determined time. Electrical contacts stop the hoists which lift the dough troughs over the mixers. The empty pan conveyor is equipped with a transfer to feed two molder-panners from the pan line, electric contacts controlling this conveying and transfer operation. Electric contacts operate pusher bars on the proofer-loader. A pusher bar also shoves pans into the oven, and electric contacts prevent the bar's operation if the oven is full.

Another automatic control device stops the depanning bar from tripping until bread is clear on the cooler conveyor. When there is a shortage of pans at the molder-panner, a bell rings automatically to notify the operator. An air-operated dumper drops molded dough into the pans. As the dough comes from the molder, it goes over an electric relay, thus controlling the air valve which moves the pans into place.

MILK



CHAIN CONVEYORS, two types. One in foreground carries cases direct, while flat top chain type (left) carries bottles. (Borden's Oklahoma City plant)

Spotcheck of the Various Types

In the remainder of this special report, the various major kinds of materials handling equipment used by food processors will be defined by function.

Belt Conveyors

No other power movers have a broader field of usefulness than the belt conveyors. This type carrier is comprised of an endless belt with a drive pulley at one end and an idler at the opposite end. There is support at intervals by rollers at both the top and bottom of the run.

Depending on the product handled, belts may be made of various types of materials—rubber, Neoprene, canvas, stainless steel, open wire mesh.

They operate satisfactorily at moderate inclines, preferably without cleats. Through the proper arrangement of snub pulleys, change in direction from horizontal to incline can be accomplished. They work smoothly and noiselessly, can be run in either direction, and packages may be removed easily. For high speed operation they are more efficient than any other continuous carrier.

Belt conveyors find application in all food plants. They are used extensively on inspection lines, particularly in canning. In many instances, the belting proper and the guides and side plates are made of corrosive-resistant material so that they can be readily cleaned and are suitable for direct contact with the food product proper.

For the handling of bulk material, of a lumpy, broken or crushed nature, in a continuous flow over a long fixed route, belt conveyors are the usual choice. A few typical examples of fixed-route installations are: In flour mills for grain, in starch houses, in malt houses, in refineries for sugar, in carrying peanuts to storage silos.

Chain Conveyors

These conveyors are made of continuous runs of chain or cable, riding on a driving sprocket, idler sprockets, and supporting rollers or guides. While furnishing the motive power, the chain may also form the actual carrying surface for the material handled. Or it may be equipped with hooks, pushers, plate tops, or other devices for engaging the material to be moved.

HYDRAULIC DUMPER rises with full load in 40 sec., for fast unloading of trucks carrying rice, corn, and like products. (San Francisco grain terminal)

SCREW CONVEYOR used in moving grains. (Rice Growers Assn., Calif.)

← GRAIN

Various types of chain conveyors are employed extensively in the food field. One type in particular—the flat, or "table top"—has been designed primarily for use in food plants. Made of stainless steel, it features smooth surfaces and fully rounded edges, and there are no pockets in which foreign matter may clog and permit bacteria growth. Further, its design permits easy cleaning.

This type conveyor presents a smooth, level, continuous-moving surface. It is used universally in bottling plants, breweries, canneries, dairies, and by practically all builders of can- and bottle-handling machinery—fillers, cappers, labelers, washers, pasteurizers, and packaging units. These chains are available in flight widths ranging from 3¼ to 7½ in.

For overhead service, a variant of the chain conveyor is used. Here, the chain is supported on trolleys that move along a suspended channel or I-beam type track. By means of hooks or clamps, loads are suspended from the chain, usually at points directly beneath the trolley. In operation, the trolley transfers the load forces to the track, while the chain serves as the mover. These units find important use in food plants, for they permit easy floor cleaning.

Slat, Platform, Apron, and Wire Mesh

Carriers of these types usually consist of slats, platforms, aprons, connected between two parallel strands of chains by means of various types of attachments. Driving sprockets and idlers are provided at the ends of the run, with suitable guides or supports for the top and bottom of the run.

Slat conveyors are sometimes built with a single chain, and at other times two or three strands are employed. The cane conveyor used in sugar mills is a type of slat conveyor that usually utilizes three strands of chains.

Slat, platform and apron conveyors are commonly used for cartons, packages, barrels, drums, and other large heavy individual pieces. They are never used for small bulk materials.

The usual wire-mesh conveyor substitutes meshing for slats. It consists of a continuous wire-mesh surface supported between two strands of chain by means of attachments. This type is used in food plants to carry many oily or wet products, the wire mesh permitting draining of the products enroute. Typical uses are in the washing of fruits and vegetables, and in the drawing of doughnuts or nuts coming from a fryer.

Another variation is employed in the cooling of various bakery, confectionery, and other products. Known as the Multi-Tier conveyor, this unit consists of a vertical series of horizontal conveyors. In this manner, efficient, extensive continuous-cooling surfaces are provided in a minimum of plant space. Recently one of these units has been employed in a can cooking operation.

Scraper, Flight, Drag Units

Two of these movers, the scraper and flight, are comprised of one or more (usually two) strands of chain running in a trough with scrapers or flights bolted on and moving on the floor of the conveyor. This type operates with equal efficiency either horizontally, or on an incline, or both. It is widely used in food plants to move many products, particularly raw materials.

Drag conveyors usually consist of a

single strand of chain running in a trough, with attachments spaced at regular intervals in the chain. Hooks or pins, bolted on, project above the floor level. The product to be carried is then readily attached to the projection and dragged along the floor.

Pusher conveyors are a simple type of chain conveyor. Having "pusher dogs" extending above the chain link, they shove boxes or cases along a horizontal or slightly inclined surface.

Bucket Elevators

Bulk materials are moved vertically by bucket elevators. This type employs a continuous belt or single or double strands of chains, with buckets, for containing the materials to be conveyed, attached at regular intervals. There are pulleys or sprockets, at the top and bottom, over which the chains pass. Usually, a specially designed loading hopper, called a "boot", is incorporated at the bottom, and a discharge chute at the top.

Frequently, "arms" (instead of buckets) are attached to carry individual boxes, crates, or barrels up moderate inclines.

The bucket elevators are used extensively in the food industry for the conveying of many types of materials —in bakeries, breweries, canneries, grain mills, sugar plants, nut plants, and many others.

Redler Conveyors

The carrier usually specified for handling finely powdered material which can be caused to flow in an enclosed duct is the Redler conveyor.

It consists of a chain to which is attached special U-shaped flights movin a rectangular, square, or circular metal duct. The duct is kept filled, and the movement of the flights causes the column of material to move through it. Material can thus be made to travel horizontally, vertically, on an incline, or around curves.

This mover finds considerable application in handling dusty food materials. For the enclosed duct minimizes dust in the plant, as well as dirt in the commodity carried. Sanitation is thus improved, and there is less chance of a hazardous atmosphere.

These conveyors are employed extensively in bakeries, breweries, confectionery, and many other food plants handling fine powdered material.

Zipper Conveyor

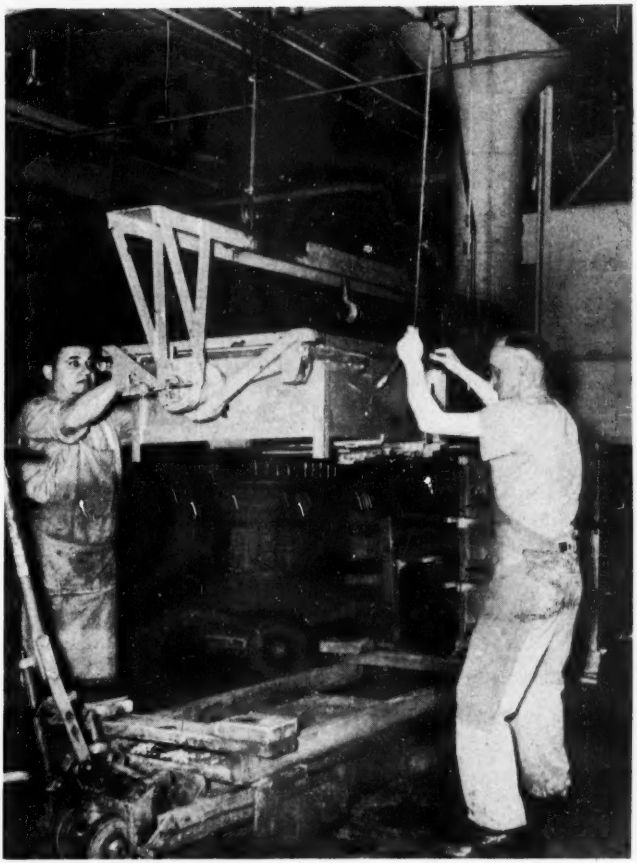
Developed within the past few years, is a new carrier—a continuous, closed-belt type capable of running in any plane, horizontal or vertical, and around corners.

This carrier consists of a three-section continuous belt, and it gets its name from the fact that it has a special closing zipper which, when shut makes the unit a moving rubber tube. It is carried on a drive and idler pulley at ends of the run and supporting idler pulleys and rollers along the run. An ingenious tripper is employed to open and close the zipper at the desired points.

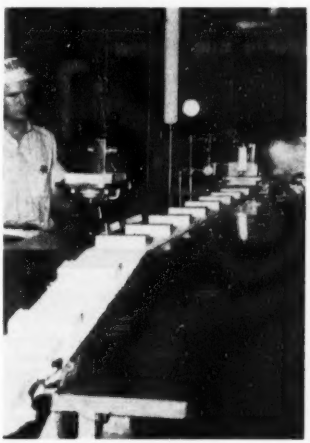
For gentle handling of such products as shelled almonds, or similar products, this unit has practically eliminated breakage and spillage.

Gravity Roller Conveyors

Conveying by gravity, frequently practical, affords the simplest, most economical means of handling. Used are a series of rollers (equally spaced and mounted on roller or ball-bearing spindles) held between the parallel

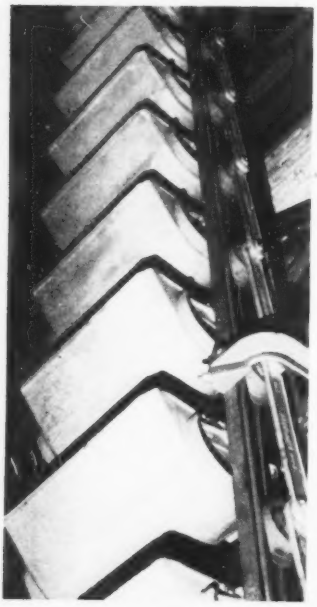


CHAIN HOIST, HAND TRUCK and pallets are employed for handling of bins of glace peel coming from circulator. (Lyons-Magnus plant, San Francisco)



SANITIZED BELT moves 1 lb. oleo molds. (Armour & Co., Chattanooga)

REFINED SUGAR



BUCKET ELEVATOR lifts sugar in refinery. (C. & D., Montreal)

sides of a structural steel frame. In selecting a roller conveyor for a particular job, the essential points are: Proper diameter, length and spacing of rolls, bearing construction, and frame sizes.

Lines of these carriers can be turned in different directions by use of special curved sections. Switch sections provide transfer of goods from one line to another. They are used extensively for the horizontal and combined horizontal and vertical movement of such containers as boxes, packages, bags, sacks. Applications for this type conveyor are found in practically every food plant—bakeries, bottling plants, breweries, dairies, canneries, just to name a few.

New Development In Rolls

With the use of new self-centering rolls, it is no longer necessary to use sideguards to keep materials on a conveyor. This development solves the problem of centering power belts, conveyor belts, or materials themselves conveyed on rollers.

Fundamentally, the device is a slightly crowned roll cut transversely at the center. The two halves are fixed to rotate as a unit. The working surfaces of the two parts are approximately horizontal, while the axes are at an angle.

In this way, the planes, or lines of force, in both halves twist evenly toward the center in the direction of movement, conferring a self-centering action on any materials passing over the rolls. Sideguides are consequently unnecessary, since goods automatically stay on the conveyor.

Roller Spirals

A means of lowering by gravity is offered with the use of roller spirals. By having a small pitch, smooth operation at a comparatively slow speed of travel is possible, so that breakage can be virtually eliminated. These units are comprised of a helical shaped gravity roller attached to a center post.

Live Roller Conveyors

Units of this type consist essentially of ordinary roller conveyors with a positive means of rotating the rolls, such as provided by a bevel gearing or a continuous belt underneath and in contact with the rolls. When a belt is employed, the necessary drawing friction is maintained by tension rolls under the belt. These are adjustable both vertically and laterally, insuring positive operation with a minimum wear on belt and bearings.

Types of packages that may be handled are limited to those which will travel on the roller conveyor. Packages may be stopped and allowed to accumulate on the conveyor.

Wheel Conveyors

Another form of the roller carrier is the wheel conveyor, in which the rollers are replaced by wheels equipped with anti-friction bearings. Usually, this conveyor is made up of two rails which have structural steel angle ties welded between frame members. The three-wheel type is a two-rail unit with a third row of wheels, in the center, mounted on through shafts. The center wheels are staggered in relation to the two outside rows.

These conveyors are usually constructed with spindles so fixed that the rims of the wheels project above the frame, providing a live surface over which objects may be pushed or move by gravity. This type mover is also available with more than three wheels, also with a solid plate between the frames, with slots provided through which the wheel rims protrude.

Wheel carriers find extensive application in canning, beverage processing, and in fruit packing for handling boxes, cases, crates, baskets. Packages handled must have a solid, reasonably firm bottom.

Ball Transfers

Where packages must be transferred at right angles, or where it is desired to turn them without lifting, ball transfers are employed.

These are comprised of a supporting steel plate on which are mounted a series of equally spaced balls that rotate on a bed of small balls contained in a hardened steel cup. Spacing of the ball units, in the transfer, varies with the weight, size, and nature of the material handled. Packages must have smooth, firm bottoms Soft wood boxes require closer ball-spacing than containers having rigid bottoms of hard wood or metal.

Screw Conveyors

This kind of carrier is comprised of a shaft to which is attached or wound a helical lip, projection, or flight rotating in a trough in a manner that the flight pushes the material from one end to the other.

Screw conveyors are employed primarily for moving dry bulk granular materials in a horizontal place, for relatively short, fixed runs. They are also employed for the movement of wet, but not free flowing, materials, such as the overrun from a wet screening operation in a starch house, or muds in a sugar mill. Loading and unloading devices are designed to suit the particular installation.

Vibrating Conveyor

A mover of this type is composed of an open or closed trough to the bottom of which is applied vibrations of high frequency by electrical or other means, causing movement of the material in the trough. Material may be conveyed horizontally, or up or down inclines. Feed can enter at any point along the conveyor via hoppers. Discharge can also be made at any point through bottom gates. These conveyors are employed for handling coarsely or finely divided materials in bulk. Raw cane sugars from centrifugals are handled in this type unit. Salt is also thus conveyed.

Solids Pumps

A unique combination of a screw and a pneumatic conveyor which causes dry material of a finely divided nature to "flow" is the dry solids pump. Material is fed by a screw through a chamber in which numerous jets of air are introduced from a ring around the pump casing. Thus the material is aerated, expanded, and caused to flow, increasing the ability of the screw to force it through a pipe line to the point of delivery. This kind of pump is used universally in modern starch houses. Cleanliness and safety in the handling of dust hazardous materials are notable features.

The canning industry has been employing a pump to elevate and convey such items as green peas, lima beans, cut corn, string beans, and almost any other solid up to 3-in. dia.

This unit, although hydraulic, is intended for the movement of solids, liquid being merely the conveying agent.

Pneumatic Conveyors

The two basic elements in pneumatic conveyors are a suction or blower unit and a pipe line through which the material travels. This equipment is usually comprised of the following parts: intake or feeder, pipe line and fittings, the separator or cyclone, the air-locked discharge, and the blower or exhauster with motor.

This equipment is finding extensive applications in the food field, now being employed to carry flour, dried milk, beans, cocoa, coffee in whole bean, ground and powdered form, peanuts, malt, semolina, rice, and many other products in powdered, ground or flake form.

One of the carrier's outstanding features is it's cleanliness—it cleans itself, leaving no residues of material to deteriorate or to become infested. The absence of moving parts, except for the blower proper and motor, makes this system simple, easy, and inexpensive to maintain. Further, dust in the plant proper, with its accompanying hazard, is also minimized with use of the pneumatic conveyor.

Chain Hoists

Employed for lifting, chain hoists consist of a line of links that is either wound on, or unwound from, a drum or sheave. Rotation of the drum is by an electric motor acting through a gear, or by a hand chain passing over a sprocket. The load is attached to the hoisting chain by a hook or other means. The whole assembly is supported from a ceiling beam or from a special structure built for the purpose. These mechanical lifters find many uses in food plants. Today, hand hoists are being made of lightweight materials, reducing the overall burden.

Skip Hoists

The small portable skip-hoist elevator, or dumper, is now finding considerable application to eliminate lifting and dumping of heavy materials. This device incorporates a structural steel frame with guides and a single skip. Attached to the latter is a cable that passes over a top sheave to a motor-driven drum at the bottom. Winding of the cable on the drum raises the skip, which automatically dumps at the top of the run. The hoist is designed for quick return.

Small, portable, hydraulically operated dumps and skips are being used in many food plants to up efficiency and eliminate back-breaking labor.

Monorail and Trolley Systems

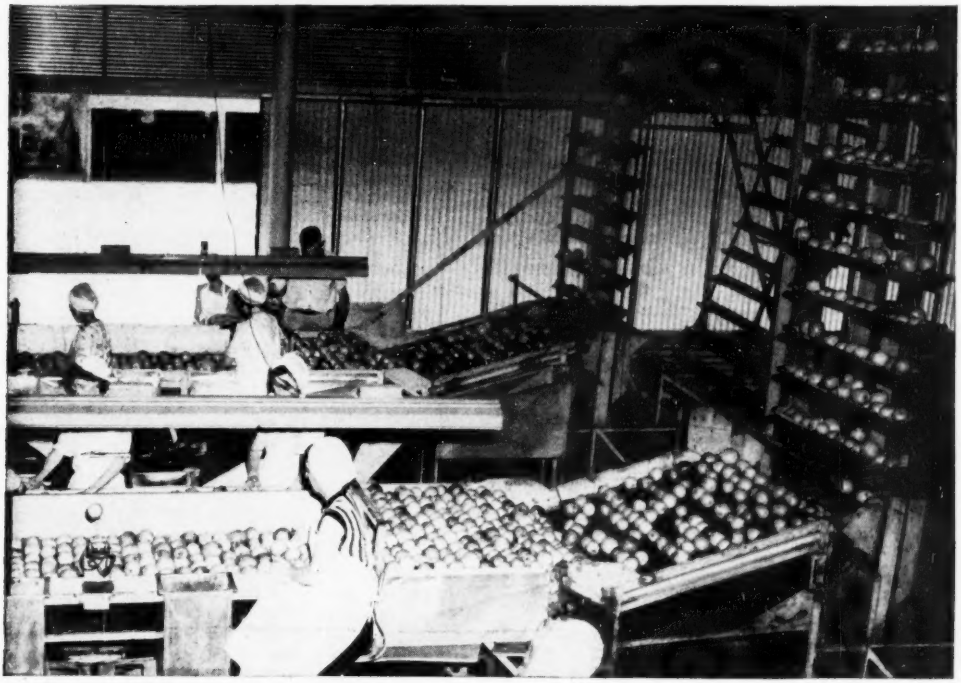
The floor-free monorail carrier system employs an overhead trackway consisting of a single track or rail, which supports a wheeled carrier. The simplest form is one in which the carrier is suspended on the rails and propelled by hand. Other systems employ for a carrier a hand operated or motor-operated chain hoist. More advanced monorails have a motor-operated hoist and are moved along by motor power. In the smaller sizes, these systems are operated from the floor. Larger types are operated from a cab.

Portable Conveyors

According to the manufacturers, a portable conveyor is defined as "a horizontal or inclined conveyor, generally of power belt or power chain construction, mounted on a mobile supporting frame of a fixed or elevating type."

These "mobiles" are used extensively

FROZEN CITRUS JUICE



ROLLER CONVEYORS, ELEVATORS are employed in grading, washing and inspection of oranges in this frozen concentrate citrus juice plant. Fruit is brought into plant via belt conveyors and continuous bucket elevators. These modern movers ease operators' tasks. (Clinton Foods, Snow Crop plant, Dunedin, Fla.)

throughout the industry. Their greatest application is in the warehousing, shipping, and receiving end of the plant—for handling cases, bags, boxes, cartons, and most type containers having at least one flat side. These units usually range from 10 to 75 ft. in length.

The Various Industrial Trucks

There are many and various types of industrial trucks employed for the moving of materials, the simplest being the two-wheel stevedore truck. These units are selected for conditions requiring only a few packages to be handled per day.

Four-wheel factory trucks. These may have platforms equipped with one, two, or more, vertical sides, solid or open frame, depending upon the materials to be moved. They are employed profitably for unfrequent movement of bulky items.

Trailers and tractors. Through the use of coupling devices, factory trucks and a power-driven tractor can be formed into trains to speed movement of materials on relatively long hauls.

Hand-lift trucks are low platforms, on wheels, with attached handles for the operator to pull and steer the unit. These trucks are provided with a manually operated lifting mechanism for elevating the platform a few inches. This permits the truck to clear a loaded or unloaded pallet from the floor and thus move unit-loads.

Powered-low-lift platform trucks are a version of the hand unit on which the operator rides. Driven by gasoline engine or electric motor, they carry heavier loads than the hand unit.

Powered hand trucks are similar to the larger, heavier platform, or fork trucks. They are useful in confined spaces because they are small and can be turned on very small radii. They are designed to handle either skid or pallet loads. Some are suitable for hoisting and stacking. Their light weight is an important advantage.

Fork-lift trucks are generally used with the pallet system of material movement. They are most economical for transporting loads for relatively short distances. Long horizontal distances keep the lifting equipment tied up too long for economy. They are capable of stacking their own loads 12 to 16 ft. high. Payloads ranging from 1,000 to 15,000 lb. and higher may be carried.

Through use of special attachments, lift trucks are employed in the direct handling of many types of containers, such as heavy drums, barrels, bales, rolls. Because of their flexibility, they are as stated earlier, frequently used in plant maintenance work.

Today, there are available, as standard equipment, a great variety of specific materials handling machines suited for particular tasks. A few of the more common employed in food plants are as follows:

Case Unloaders

Units are now in operation that automatically remove bottles from cases, placing the bottles on conveyors or loaders leading to the washer. Auxiliary equipment dumps debris from the empty case.

Bottle Elevators

Another recent development is a continuous bottle elevator. This consists of two chains, faced with small, corrugated hard rubber lugs, that grip the bottles on both sides to hold them during vertical conveying.

Retort Loader-Unloader

Through use of a new retort loader-unloader, labor of 7 to 11 workers is saved for each closing machine or canning line. The unit is comprised of motor-rotated perforated, can-holding disks in a retort. In operation, it takes cans from the closing machine by means of an elevator and cableway. Sterilized cans are discharged from the disks into another runway. The unit loads at 300 cans per minute, unloads at 600 cans per minute.

Another type automatic retort loader employs magnetic lifting power. This unit consists of a storage conveyor, a collecting table, and magnetic loader. In operation, a preset number of cans or jars are received from the closing line into a rotating collector disk. When the disk is filled, the waiting magnet is hydraulically lowered to pick up the containers. Magnet arm is then swung to lower containers into retort crate.

Automatic Pallet Loader

Costly, laborious, and often careless hand stacking of cases is eliminated through the use of an automatic pallet loader. One of these machines is capable of palletizing 1,200 to 1,500 cases per hour.

In operation, cases enter the loader from a conventional conveyor system. They pass over a turntable that automatically rotates some of the cases a quarter turn in accordance with a predetermined stacking pattern. When a complete row of cases has entered the machine, a powered ram slides them onto a stripper plate. Then succeeding rows complete the layer. The next layer will have an alternate arrangement to form a bond.

As each layer is completed, the stripper plate slides out from beneath, permitting the layer to drop ¾ in. onto the pallet or a lower layer of cases. When the pallet is fully loaded, it descends onto chain conveyors which eject it from the machine to roller conveyors. From here, the loaded pallet is removed by lift trucks. Empty pallets are stacked in a magazine provided in the unit for that purpose.

Milk Case Loader

A recent development is a machine which automatically cases filled milk bottles at the rate of 7,200 qt. per hr. Metal bars comprise the pick-up head, that has three sections, each of which lifts four bottles from a conveyor in sequence. Then head moves over case and lowers bottles into it. If case is damaged, or no case is there, head does not operate.

Unscramblers

Usually employed in unscramblers are specially arranged moving belts and guide rails. These serve to automatically deliver containers, from an irregular grouping, in single file to a desired machine, such as a filler.

Tilting Platforms

Hydraulically operated tilting platforms, vertical lifts, or ground ramps, enable trucks and trailers to be loaded and unloaded faster, safer, easier, and at reduced cost. These mechanical units can be quickly adjusted to make the floor or tailgate of the carrier exactly level with the platform against which it is backed.

Empty Can Unloader

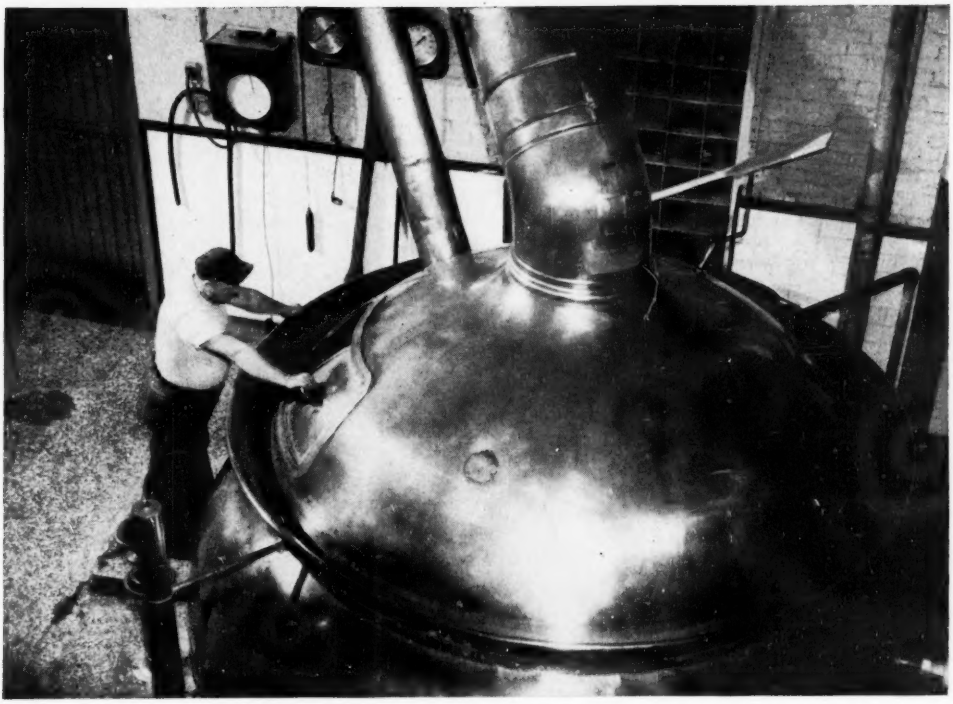
Work of the two or more men formerly required to remove empty cans from cases is completely eliminated with use of an automatic uncaser.

This machine automatically opens single-layer cases, removes the empty cans, deposits them on a conveyor line, and places the empty case on another conveyor leading to the casing machine.

Table Levelers

Another machine developed to speed handling is the portable unit that automatically raise and lower materials to convenient working levels. In food plants it finds extensive use where materials are transferred to trays.

Your materials handling engineer, or some one trained in the science, should be consulted on every materials handling problem. For, practically every situation in the moving of materials constitutes a problem in itself. In the determination and analysis of a materials handling problem the factors involved which must be defined include: *Material* to be handled, what is it *in*, *where* is it going, how *far*, how *frequently*, how *fast*, *labor* required, and what *equipment* would be used to effect movement.



DOUBLE CHECK by recording instrument at brew kettle, insures correct boiling time, thus more uniform brews.

Recorders Assure Better Brews

Brewery improves product when temperature-tabbing instruments are put on mash tubs and brew kettles. Steam, refrigeration saved by boiler room units

NESBERT APPEL and WILLIAM THEW

Brew Master and Chief Engineer, respectively, Fuhrmann & Schmidt Brewing Co., Shamokin, Pa.

Increased operating efficiency and consistently high product quality are outstanding benefits credited to greater instrumentation at the Fuhrmann & Schmidt's brewery in Shamokin, Pa.

For many years this medium-size brewery relied upon the vigilance of its brewmaster to protect the high quality of its beer, porter, and ale. However, when increased demand for its products made necessary the addition of a second shift, F & S decided to install recording thermometers at key points in the brewing operation in order to insure maintenance of the excellent quality even when the brewmaster cannot be on hand.

■**Even though the program is not yet fully complete, the company feels that the units now installed have already paid for themselves.**

The exact knowledge of brewing conditions brought about by the instrumentation has made a difference in maintaining quality and uniformity of the volume-produced beverages and has generally improved operations.

Mashing and Brewing Tabbed

Probably the most important single instrument in this installation, so far as its effect on the quality of the brew is concerned, is the recording thermometer on the mash tub. Both the time and temperature of each step in the mashing operation must be closely supervised, and the history of each batch, as shown by the record chart (see accompanying illustration), immediately tells the brewmaster whether or not the proper care has been exercised. The characteristic time-temperature pattern for proper mashing soon becomes as identifiable to the brewmaster as his own signature.

In addition to the record drawn by the instrument, the operator marks down the brew number and mash tub time on the chart. By making it a practice to have the men jot down this sort of information, a complete record is obtained.

Since the operator also enters his own name, at this time, there is never any question regarding responsibility in event of deviations from normal schedule. Records are filed. And if

any brew should fail to be up to standard, it is possible to check the complete history of its production and thus find the source of trouble.

Brewing Time Recorded

Because of the extreme importance of boiling time in determining flavor of the brew, a recording thermometer was also installed on the brewing kettle. When no record was kept, there was a tendency toward wide variations in boiling times, with a resulting lack of uniformity in the quality of the brew.

Now, with these two records—of mashing and boiling—the brewmaster has proof that the wort has been made according to his directions. Taken together, they afford a continuous account of the brew up to the time it passes through the hops strainer to the hot wort tank.

Temperature of the hot wort tank is not recorded. But the cooler over which the wort flows before being drained to the starter tank is equipped with a recorder. This provides assurance that the yeast has been pitched at the proper temperature.

In the fermentation tanks, the temperature can again be measured, but here it is not considered sufficiently important to require a separate recorder for each tank. Instead, a thermocouple has been installed in each of the fermentation tanks and each of the storage tanks. These, couples are wired to a centrally located electronic potentiometer, and here there is a pushbutton selector panel. This instrument shows the temperature of the beer in any of the fermentation tanks. Periodic checking is satisfactory, since these temperatures remain fairly constant, although they tend to rise gradually during fermentation.

The multi-point indicator now measures temperatures in a dozen tanks. Moreover, there are extra pushbuttons which will take care of another dozen tanks being installed in the new cellar.

Filtration and Storage

Although the wort has been filtered after the initial cooling, the beer is twice filtered and recooled to desired temperatures before being filled into kegs or bottles for distribution.

As the beer is filtered and polished, the temperature is again recorded. These temperatures may vary within wide limits without any harmful effect, but the use of a recorder makes it an easy matter for the operator to balance flow of refrigerant against flow of beer in order to obtain thorough cooling without freezing.

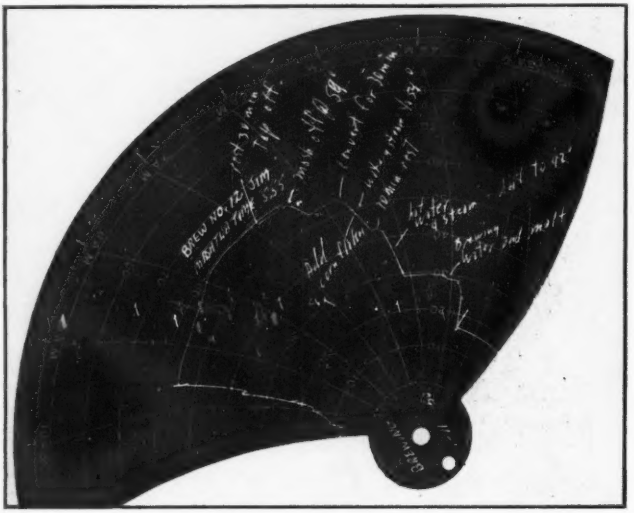
In the engine room, a multi-point precision indicator helps the chief engineer to determine his refrigeration demands throughout the day and night. A two-pen pressure recorder, measuring suction and head pressures of the ammonia system, checks on the performance of the compressors in meeting the demands.

Steam pressure is continuously measured to aid in efficient boiler operation, and a flow meter is being added to give a clearer picture of steam consumption.

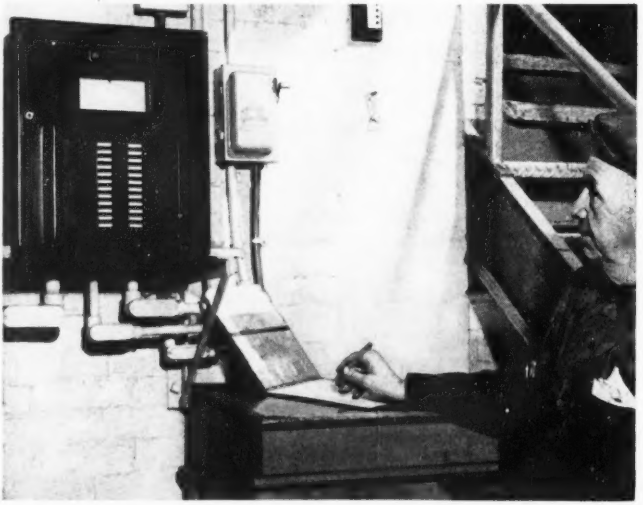
Results of the program have been highly encouraging to date. As stated, the equipment has paid for itself by helping to produce better, more uniform brews. The instruments have also reduced production costs by helping to eliminate wasteful use of steam and refrigeration.

Further improvements could be effected by use of controllers on mash tubs, kettles, and beer coolers. However, at F & S, the initial need emphasized the process measurements recounted here.

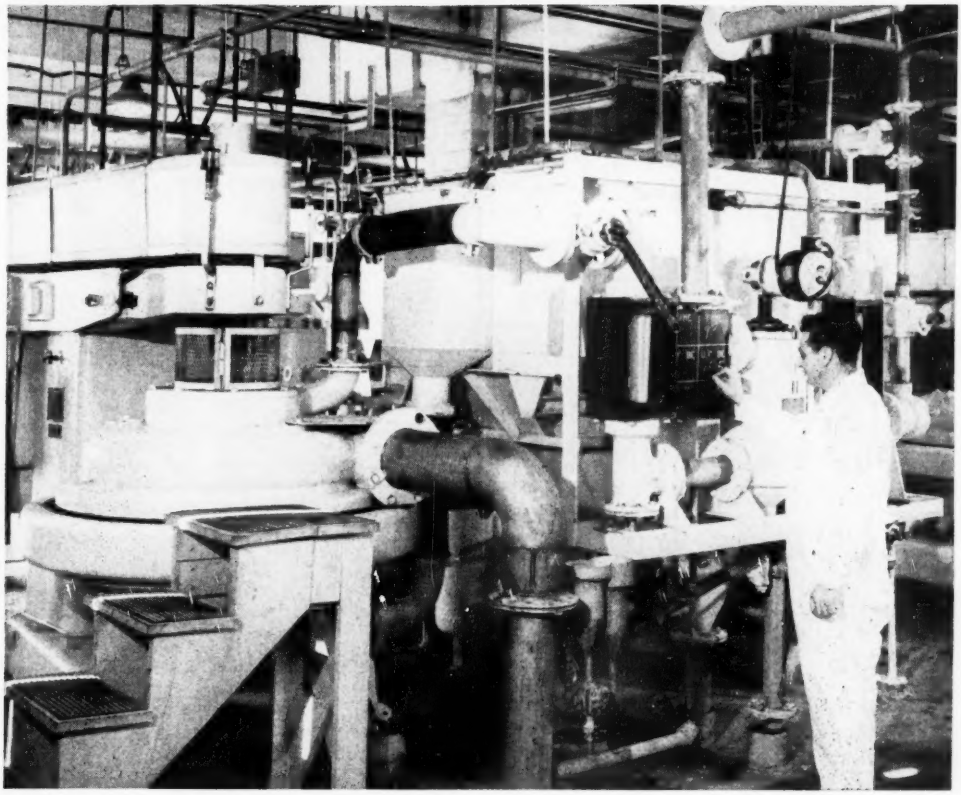
Sample Chart . . . Selector Panel



SECTION of chart from mash tub. Jottings show how Brew No. 12 proceeded through mashing cycle from 3.40 A. M. until it was drawn to kettle at 9.55.



AUTHOR THEW, chief engineer, is now able to determine temperatures in fermentation tanks by means of pushbutton selector (left) in engine room.



TWENTY-THREE of these centrifuges for separation of gluten and starch replace obsolete wooden starch tables which had required an entire six-story building. Starch yield is greater and of higher quality. Process is more sanitary.

Topnotch Wet Corn Mill House

Among highlights of advanced engineering program at 53,000-bu.-a-day Staley plant are: All centrifugal gluten-starch separation, stainless steel throughout, automatic sulfur dioxide control, and sluicing system for steep tanks

WILLIAM BISHOP and JAMES DUSTIN

Technical Superintendent and Senior Chemical Engineer, respectively, A. E. Staley Manufacturing Co., Decatur, Ill.

Recent modernization of its mill house and adjacent operations make A. E. Staley Manufacturing Co.'s wet corn milling process one of the most advanced in the country.

The plant is designed to grind 53,000 bu. per day. The resulting primary products from this amount of corn are approximately: 1,696,000 lb. starch; 689,000 lb. feed; 76,300 lb. corn oil; 100,000 lb. corn germ meal; and 100,000 lb. miscellaneous feed and nutrients.

Highlights of the advanced engineering program centering around the mill house are: (1) Complete replacement of starch tables by centrifugals for separation of gluten and starch; (2) all stainless steel enclosed shaker screens; (3) stainless steel tubing and tanks throughout the building; (4) automatic sulfur dioxide control and sluicing system for the steep tanks; (5) electrical interlocking of equipment; (6) new devices in corn elevators and an ultra-modern feed packing house; and (7) installation of modern corn oil expellers.

An overall picture of the operation is presented by the simplified mill house flow diagram of Fig. 1. For

FIG. 1 — MILL HOUSE FLOW DIAGRAM

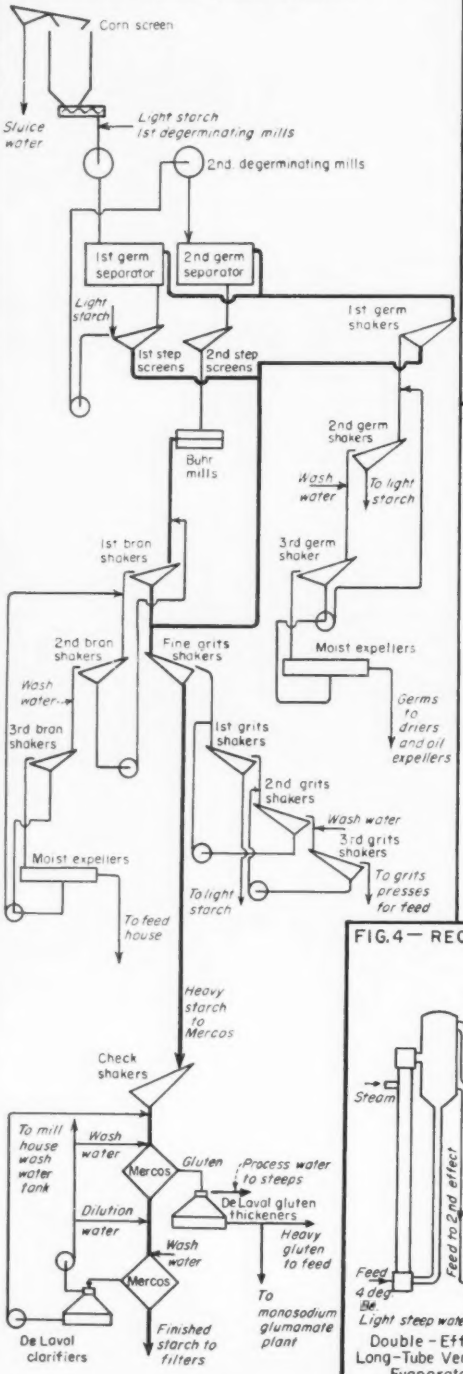


FIG. 2 — AUTOMATIC SULFUR DIOXIDE CONTROL

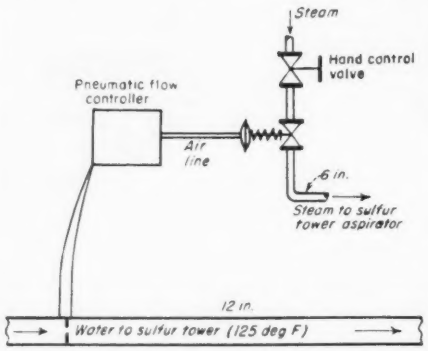


FIG. 3 — SLUICING SYSTEM

For Moving Corn From Steep Tanks to Dewatering Screens

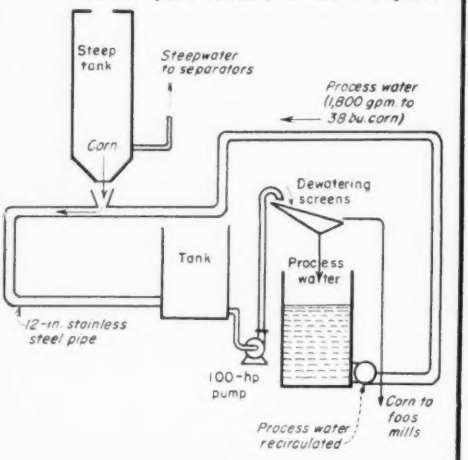
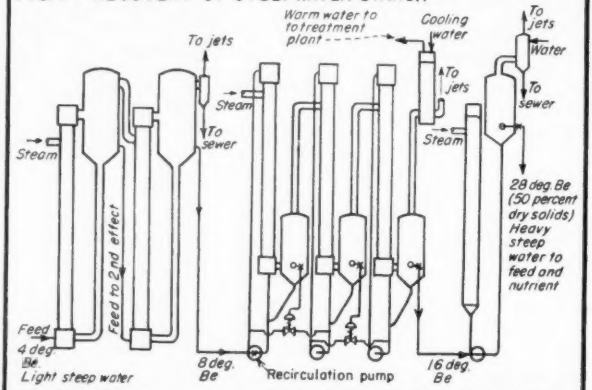
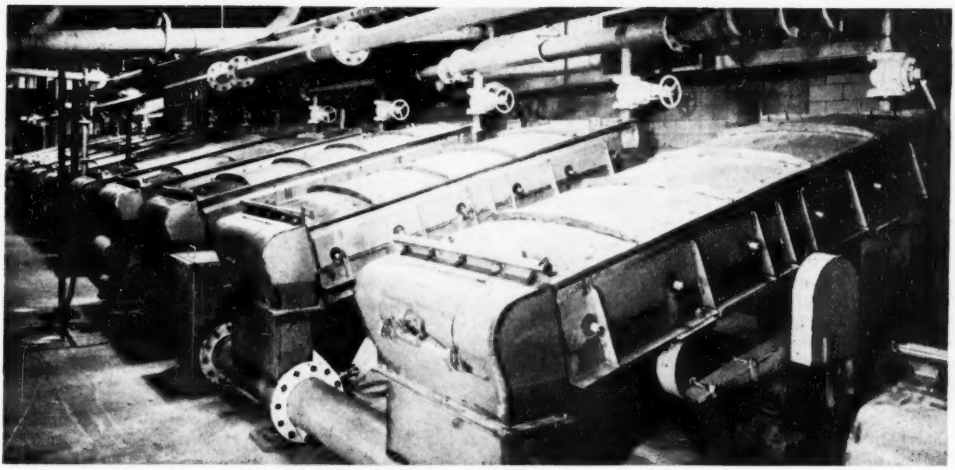
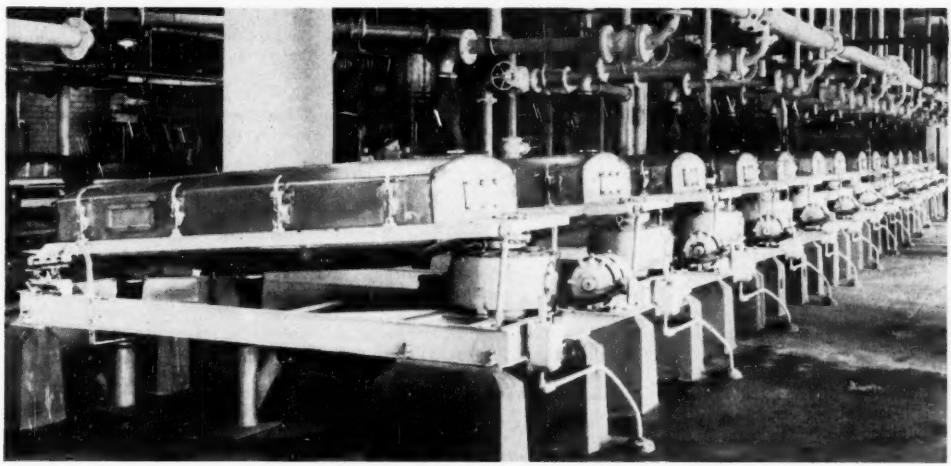


FIG. 4 — RECOVERY OF STEEPWATER STARCH





ALL STAINLESS-STEEL enclosed shakers for bran are more sanitary than old wooden screens and reels.



GRITS are washed in these nylon-screen shakers that employ rubber balls to give higher through-put.

maximum clarity our discussion will follow the process, highlighting the advanced engineering.

Safety Switches On Corn Elevators

Notable features of the corn elevators, besides the 6,000,000-bu. capacity and 300,000-bu. working capacity, are their safety devices. Limit motion switches have been installed. In an emergency, they automatically stop operation and sound an alarm.

Shelled corn from the elevator is screened and aspirated to remove foreign material before entering the steep tanks. There are 38 steeps, 2,500 bu. each, for soaking and softening the corn prior to grinding.

The remodeled steep house has an acid-brick floor. In contrast to the old concrete floor, acid brick is easy to keep clean because it does not roughen. There is a sump pump on the first floor that recovers all overflow through a curbed overflow collection system at the top of the steeps. This is pumped back into the steeps.

Water for the steeps flows through the sulfur tower. The amount of sulfur dioxide incorporated into the water is automatically maintained at a constant rate by a new control system (Fig. 2). Rate of flow of water to the sulfur dioxide absorption towers automatically controls the amount of SO_2 going to the towers. As the water flow increases, more sulfur is drawn in, and vice versa.

In Fig. 2 the pneumatic flow controller compensates for surges in water flow, holding the ratio of SO_2 to water at a constant level of 0.20 to 0.25 percent. A hand valve ahead of the control valve enables the operator to vary the pressure to obtain desired control level. Temperature of steepwater is 125 deg. F.

At present, sulfur dioxide is obtained by burning raw powdered sulfur in a horizontal rotary unit. But this results in excessive clogging. A new system for introducing liquid sulfur to the burner, is now installed and will soon be in operation. Powdered sulfur will be melted separately, then introduced as a liquid into the burner through a steam-jacketed pump.

Accompanying picture shows the new burner.

The sulfur dioxide serves as a preservative and a bacteria control throughout the steeping and wet milling operation. It is subsequently completely removed from the final products by stages of washing and evaporating.

In the steeps, each batch of corn soaks in constantly circulating steepwater for 40 hr. Fresh water from the sulfur tower is introduced into the steep containing corn that will be discharged next. Spent water is discharged from the steep that was last filled with corn. Thus, there is a counter-current flow, in which the freshest water acts where it will do the most good.

New Series of Evaporators

This steepwater, containing corn solubles, protein, lactic acid, phytic acid, sugars and ash, is sent through a newly installed series of evaporators (Fig. 4).

The evaporator station for concentration of steepwater consists of three units in series: First, a double-effect long-tube vertical evaporator in which the film rises by natural circulation; then a triple-effect falling-film unit; and finally, a single-effect forced-circulation evaporator. As can be seen in the diagram, steepwater emerges from the first unit at 8 deg. Baumé, from the second at 16 deg. Baumé, and ends up at 28 deg. Baumé. It is then composed of 50 percent dry solids. This concentrated liquid is added to feed or further processed as nutrient products.

Sluicing System for Corn

Replacing conveyors and elevators for moving corn from the steeps to the mill house dewatering screens is a new sluicing system, more accurately termed a hydraulic conveyor (Fig. 3). Corn drops from the steeps into a 12-in. stainless steel pipe. Water in the ratio of 1,800 gpm. for 38 bu. of corn (6 to 1 by weight) carries it to a tank. A 100-hp. pump sends it up over dewatering screens, from which corn proceeds to the degerminating mills. Water from the screens recirculates back to the sluicing system.

This method of conveying is much more sanitary than ordinary methods because of the smooth-surfaced pipe and high-velocity flow. It requires little maintenance, and even that little is concentrated at the pumps and shakers.

Perhaps the least spectacular—but a most noteworthy—change is the complete replacement of cast iron piping with thin-walled 14-gage stainless steel tubing. The stainless tubes are smoother-surfaced, more sanitary. And because they're lighter, maintenance work is simplified. Where before six men were required to replace the larger sections of pipe, now two workers can do the job because stainless is so much lighter and easier to handle. Use of split flanges on this pipe has considerably simplified installation and maintenance.

Old concrete and wooden tanks have been replaced by stainless steel tanks. The concrete type eroded continually, resulting in sand being carried along in the flow of material. Such particles, while not particularly injurious to the old starch tables, present a considerable problem where centrifuges are employed. Stainless steel is much easier to keep clean than either wood or concrete.

After the corn has gone through the degerminating mills, germs are separated from the starch and fiber slurry in standard type stainless-lined germ separators. Germs, because of their lower specific gravity, float over the top of the separators. They are then sent to shakers, to remove starch and then to the moisture expellers. They are then dried in rotary steam tube dryers and sent to the newly installed Anderson Super Duo oil expellers.

The centralized lubrication system used on the expellers was installed by the Farval Corp., Cleveland. As pictured, operator simply jacks the lever until the pressure gage is where he wants it. Then he lets go, and lubricant is automatically injected into all parts as needed. This is done only once each shift. Amount of lubricant for each part is controlled by the series of small valves enclosed in small glass cylinders. These valves are preset at installation. The glass cylinders give a visible indication of lubricant supply to all points when hydraulic pressure is reached.

Underflow from the germ separators —fiber and starch slurry—is sent over separating screens. Fibers are ground in Buhr mills and pass over stainless steel enclosed bran and grits shaker screens. At this point, a separation is made, with the fraction of material retained on 24-mesh screen classified as bran, and the fraction retained on 17XX nylon classified as grits.

Referring to the mill house flow diagram, note how the heavy starch underflows are accumulated and sent to the centrifuges.

The separator screens and the bran and grits shakers are newly installed stainless-steel units. Separator screens and bran shakers are made by the Link-Belt Co., the Roball grits shakers by the J. H. Day Co. They are more sanitary than the old wooden shakers and reels. Since they're completely enclosed, splash and escape of SO_2 vapors are eliminated.

Separating screens are powered by 3-hp. 1,800-rpm. motors. The grits shakers have individual drives, being powered by 2-hp. 1,800-rpm. motors. They require less space than reels, give a higher capacity per unit of screen area, and are easier to maintain. The higher capacities are due to increased motion; instead of simply moving back and forth, they oscillate in a circular motion.

Rubber Balls in Grits Shakers

Screens on the separator and bran shakers are made of woven stainless-steel wire. Shakers for grits employ an advanced type of nylon screen. Panels of nylon are tacked to a wooden frame divided into 15 sections (the only wood used on the units. Hi Car rubber balls beneath the nylon continuously vibrate the cloth, giving higher through-put. The underside of the frame is covered with two-mesh stainless wire screen that acts as a retaining screen for the live rubber balls and as a rough surface to cause the balls to bounce. As the shaker osillates, the balls bounce up against the nylon, preventing clogging and yielding a better separating action. There are six 1⅜-in. balls per section. These fine grits shakers replaced the wooden types in the ratio of 1 for 2.

Centrifugals Replace Starch Tables

Bran and grits, after being washed in a 3-pass counter-current washing system, are sent to the feed house. Underflows of light starch are recirculated back to the mills, where they become heavy starch. This then goes to the Merco centrifuges via the shakers for separation of high-protein gluten from starch.

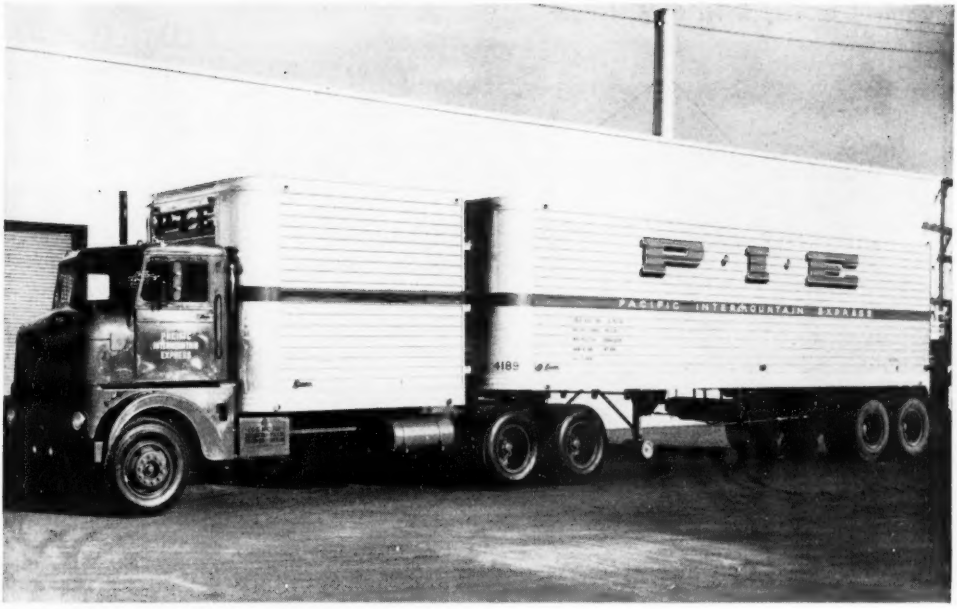
The formerly-used starch tables took up an entire six-story building. Now, 23 centrifugals take up only about a twentieth of that space.

All the centrifugals are housed within an area 60 x 100 ft. The old starch tables measured 100 x 3 ft. And since there were 432 of them, 129,600 sq. ft. of space was taken up by the tables alone.

This great reduction in operating area has contributed to efficiency and has greatly minimized the sanitation problem. The concrete and tile construction which replaced wood has eliminated insect breeding areas possible in wooden structure.

To review the operation of the Mercos, the gluten-starch mixture is fed through an indicating rotameter into the top of a cone-shaped bowl rotating at 2,500 rpm. The lighter gluten overflows at the top and is sent to DeLaval thickeners (23 of them replace all the old settling tanks). Heavier starch comes off through

(*Turn to page* 211)



ADDITIONAL LOAD and unit length is added when trailer crosses "western state line."

P.I.E. Also Loads the Tractor

Differences in legal trucking weights and lengths between states is circumvented by its newly designed vehicles that eliminate extra freight handling

ALL TRACTORS up to now have pulled, never carried, their loads. But a new type tractor recently put into operation by Pacific Intermountain Express, and called the dromedary, actually totes part of the load and hauls the balance behind in a semi-trailer.

P.I.E., carrier of dry and perishable foods, along with other goods, between Chicago and the west coast cities, designed the new tractor to circumvent the differences between larger gross vehicle weights and longer overall vehicle lengths, legal by state laws west of Denver, and the smaller weights and shorter vehicles legal east of Denver.

These differences required the unloading at Denver of the heavier and longer eastbound vehicles and the rehandling of the freight into smaller and shorter vehicles to complete the eastward run into Chicago. Similarly, the smaller westbound vehicles had to be unloaded at Denver and reloaded into larger units in order to take advantage of the heavier allowable loads west of Denver.

This costly rehandling causing delays in transit has been eliminated by the new dromedary, which pulls behind it a 35-ft. semi-trailer.

The dromedaries, first of which went into service in October, 1950, do not run east of Denver but shuttle back and forth from Denver through the States of Colorado, Wyoming, Utah, Nevada and California to the P.I.E. terminals in Oakland and Los Angeles.

An eastbound Chicago trailer is disconnected from the dromedary tractor at Denver and hooked up to a leased standard tractor to complete the run. Meanwhile the load carried on the dromedary tractor itself is unloaded for Denver delivery or is used to build up a full 35-ft. trailer eastbound load. To unload, the tractor is backed to the terminal platform and a special steel ramp (extending over the tractor fifth-wheel from the rear of the tractor body to the edge of the unloading platform) is brought into use.

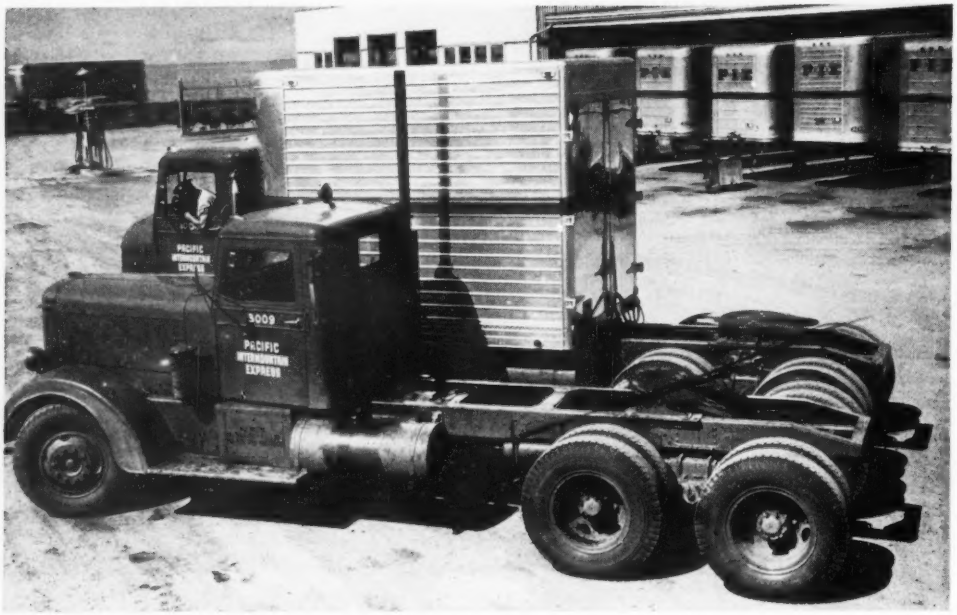
Shipments originating in Chicago and bound for the west coast are carried in a 35-ft. trailer pulled by a leased standard tractor, giving a total overall length of 45 ft., legal in the states of Illinois, Missouri and Kansas. The trailer is disconnected at Denver and hooked up to a load-carrying dromedary for the remainder of the run west.

The dromedary and its 35-ft. semi-trailer has a greater overall length—54 ft. 8 in. The dromedary tractor body is made of aluminum, weighs 1,340 lb., is 12 ft. long by 8 ft. wide and 8½ ft. high, has double rear doors, and is permanently attached to the tractor chassis.

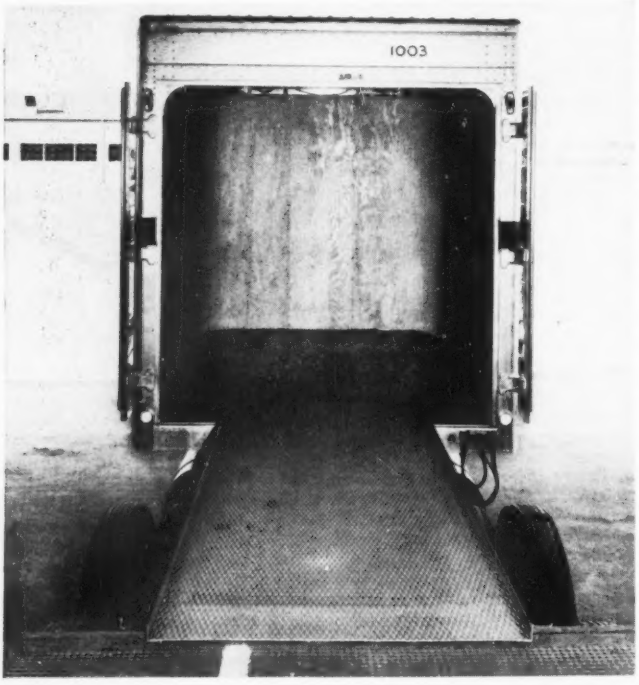
Adds 664 Cu.Ft. of Space

The tractor body conforms to the height and width of the semi-trailer body so as to make an attractive streamlined overall appearance, as seen in the accompanying illustration. The tractor body provides an additional 664 cu.ft of cargo space.

"Camel" is only 3 ft. 8 in. longer



TO REDUCE the overall length of the dromedary tractor-trailer unit and still permit the tractor to carry a 12 ft. body, the cab-over-engine design was adopted to give a unit length of 54 ft. 8 in.



STEEL UNLOADING ramp is bridged from tractor body to receiving platform.

Depending upon the unit weight of the freight being handled, the additional tractor cargo space may accommodate as much as 2,200 lb. of payload, which otherwise would not move on the same schedule. Such additional payloads can be carried without exceeding the maximum allowable gross vehicle weights west of Denver.

How They're Powered

The dromedary tractors are built to order by the Peterbilt Motors Co., Oakland, Calif., and the dromedary bodies are made by Brown Trailers, Inc., Spokane, Wash. Of the first order for 30 of the new tractors, 10 were equipped with 300-hp. Cummins diesel engines and the balance with 200 hp. Cummins diesels that are standard on the other 112 tractors used by P.I.E. on its runs between Denver and the west coast.

To reduce the overall length of the dromedary tractor and semi-trailer unit and still permit the former to carry its 12 ft. body, the tractor is of the cab-over-engine type. The resulting overall length of 54 ft. 8 in. is well within the legal limits.

Thus the dromedary and semi-trailer unit is only 3 ft. 8 in. longer than the standard P.I.E. tractors with their engines out in front and the same length trailers.

We Think . . .

▪ Washington Fireworks Shoot Off In All Directions

Recent developments in Washington remind one of a pinwheel with a delayed fuse. Nothing happened for a long time, and then helter-skelter hell broke loose.

The warmed-over wage freeze won't keep labor costs down. The adjustable price ceilings won't contain prices. The government's cheap-money policies contribute to inflation. So you can count on the dollar getting cheaper and cheaper, with proportionate increases in your operating costs.

Meanwhile, you face a big boost in taxes, making your profit picture even dimmer.

But of all these developments, the proposed stiff tax rates make the most sense. This is true because the greatest threat on the economic front is a continuation of the inflation spiral. And it looks very much as though only stiff taxation, which reduces buying power when many products are scarce or off the market entirely, is the only way to hold prices down. And only by paying for the defense program on a current basis can we avoid a disastrous national debt in future years.

The Washington maneuver that really burns is the attempt to sneak the discredited Brannan plan in through the back door. And don't say the Secretary didn't warn you. We quote: "The very thing we are doing, stimulating production, creates the possibility that we may have to go in and support some of the perishable commodities. . . . I would say that production payments is the best way."

One can have little respect for politicians who use a national emergency as a cover for their insidious pet schemes.

▪ Now You Can Go To Jail For Your Packaging Mistakes

NPA's tin can restriction order M-25 should have been mailed to food processors along with a big bottle of aspirin. The restrictions could be a lot worse—and probably will be in a future order. But they are complicated by that quarterly quota business, and the requirement that the quarterly pack be spread as evenly as possible over each of the three months. The asterisk designations also are footnotes to confusion. Then, too, canners packing for the military may get entangled in precoating and procoating to improve the outside corrosion resistance of the thinner tin film.

But confusion or no, you better not make a mistake. If you do, you may be fined, tossed into jail, or both. Or you may even lose your right to buy cans altogether. You accept full responsibility and sign a potential jail sentence every time you receive a new shipment of tin containers.

Of course, your mistake has to be willful. But can one prove that a slip-up is just in fun, especially when ignorance of the regulations is no excuse? We doubt if one should risk it. Better to put an alert eagle-eye on the job of seeing that you comply.

By all means don't be the first one to be caught. They talk about making "national examples" of the first individuals to ignore their new floating ceilings, thawed freezes and other regulations out of Washington.

But cheer up. By the time you are taking M-25 in stride, there likely will be a new version of it which is more-so.

Incidentally, the extensive use of 0.25 tinplate where 0.50 formerly was employed is a tribute to progress through electrolytic plating.

▪ You Might Well Take a Leaf From the Gorrell Book

"He's a great guy." "He's a wise old bird." "They call him Frank." In those terse but meaningful terms, close friends indicated their respect for Frank E. Gorrell, secretary of National Canners Association from its founding in 1907 until 1945. When this grand old man of the canning industry passed away in January at the age of 83, his loss was mourned by an entire branch of the food industry.

There is good reason. The story behind the respect and love for Mr. Gorrell is pretty much the story of the modern canning industry. And this story involves a success pattern which fits all branches of the food field, all industry associations, all companies, and all individuals.

The story starts in the spare room of a blacksmith and carriage shop in Bel Air, Md., which NCA rented as its first office in 1907 for $3 a month. The association staff consisted of one man—Frank Gorrell.

Forty-three years later, NCA dedicated a new 3-story, million dollar research and administrative headquarters in Washington, D. C., and another research laboratory is being built in Berkeley, Calif. The staff exceeds 100 people, who man 13 separate branches of service to canners.

Along the path from the blacksmith shop to the million dollar headquarters are many guideposts in the form of sound principles and policies. From the beginning, Mr. Gorrell had a keen appreciation of research as the means of solving the industry's problems and pointing the way to progress.

He used research to improve tin cans, to prove that tin picked up by the food was not harmful to consumers, to banish prejudice against canned foods, and still the "ptomaine poisoning" fears of consumers. It was through research, too, that sound basic processing principles and adequate retort times and temperatures were established.

The list of research achievements is quite long, but that is only part of the Gorrell story. Information and reliable statistics on canned foods and the canning industry have been compiled and disseminated, labeling and legal problems have been solved, the industry has been protected against unjust consumer damage claims. In two world wars, NCA helped the military figure out answers to feeding and food procurement problems. A hand has been taken in shaping sound and progressive food laws, regulations, standards

and container specifications.. And members have been kept posted on significant technical, economic and Washington developments.

All of this has been done on a constructive basis, without prejudice, and in the spirit of progress.

It may come as a surprise that the guiding genius was neither a canner nor a technologist. Frank Gorrell started as a school teacher, then he studied law, subsequently was editor and publisher of the Bel Air *Aegis*, and he was interested in politics.

These early activities apparently made him a man of rare insight and foresight. He always insisted that the association and the industry work together to raise the standard of all canned foods and give consumers their money's worth. And today canned food is one of the best buys on the market.

Mr. Gorrell had a remarkable sense of direction and unusual ability to measure men and their motives. These qualities he combined with an extraordinary patience which kept him from going off half-cocked, and an outstanding ability to get people to roll up their sleeves and pitch into a job once a decision was reached. He also was known as a human catalyst who could effect a favorable reaction between people with incompatible views.

Ability to direct projects without becoming smothered with details was another of his assets. He relied upon carefully selected associates to see a job through and depended upon progress reports to tell him when he needed to take a hand. Not a believer in oratorical spell-binding, the modest NCA secretary depended upon intimate contact with individuals or small groups to get his ideas across.

All food groups can well take a lesson from his technic with Congressmen. It was simply to get solid facts and lay them face up before the legislators. He firmly believed that plain facts—minus biased misrepresentations and psuedo data—were the hardest things in the world to lick.

He used this factual approach to all problems. When studies indicated that vitamin C was damaged in retorting, he decided to use further research to get the whole truth, whatever the results. As it turned out, research proved the vitamin content of canned foods to be better than anyone had previously realized.

The canning industry derived tremendous benefits from the inspired and devoted leadership of Frank Gorrell. Those who came in contact with him profited from that association. And everyone can benefit by following his enlightened principles and practices.

He was a great guy.

▪ Shortage of Technical Men Makes Deferments Advisable

Within the big national emergency, a small but highly significant domestic emergency is developing. A report from American Society for Engineering Education indicates a shocking shortage of engineers in the near future.

Industry needs at least 30,000 engineers a year. But the nation's technical schools will graduate only 22,000 in 1952, 17,000 in 1953, and 12,000 in 1954, based upon present enrollments. This situation stems from the small "depression generation" and an unfortunate government prediction about a year ago that there would be a surplus of engineers. This erroneous forecast steered many high school graduates away from engineering courses.

Since there is no doubt but that the industrial power and technical ingenuity of this nation are its most potent weapons, nothing should be done to further curtail the supply of technical talent. Which means that engineers, chemists and other technical men should not be taken into the armed forces except to the extent that they are needed in their professional capacity. And college students taking technical courses should be permitted, even encouraged, to complete their education.

No one likes to see any group of individuals deferred from military service. No favors should be shown when men are asked to die for their country. But if the country does not have enough technical manpower to produce superior weapons and supplies in sufficient quantity, thousands of lives will be needlessly sacrificed on the battlefields. And the domestic front will suffer from lack of that industrial vitality imparted by technical advance.

Technical men are highly essential in this atomic age.

▪ An "Amateur Consultant" Sometimes Really Helps

Almost every division of the food plant includes among its personnel some nosey, fussy, talkative sort of man or woman. Sometimes this person is that way by nature, and nothing can be done about it. Occasionally, such an individual is exhibiting a repressed desire to have things done better.

It sometimes is a good idea for the supervisor to ask an employee of this type to look things over, make a list of the things he thinks are wrong, and suggest remedies. A great many critics quiet down quickly when they have to "put up or shut up." Then again, they occasionally come through with good ideas.

Rotating this type of assignment through the entire staff has advantages, too. It at least gets a lot of fresh points of view. Occasionally, the superintendent finds out something which he has been overlooking because of sheer familiarity.

Thoughtless use of the "amateur consultant" idea is dangerous, of course. Wisely used, the technic becomes a constructive builder of good personnel relations.

▪ More "Buy-Me-Again" Appeal Needed in Packaging Specialties

The packaging of some of the newer bakers' specialty items leaves something to be desired. In particular, the instructions as to the use of these products often have been poorly presented.

Advertising managers usually insist on a design that develops maximum "Buy-Me" appeal. But they sometimes overlook the equally important "Buy-Me-Again" factor.

Some packages have their instructions poorly presented in small, light-face type. And the printing may be obscured by folds in the wrappers. All of this gives the impression that the instructions as to proper use of the contents were an afterthought. A complete redesign is in order.

To neglect instructions and their legibility is to neglect about 25 percent of the marketing function of the package.

It's the Nash!

The ability of Nash Compressors to maintain original performance over long periods is no accident. Nash Compressors have but a single moving element, the Nash Rotor. This rotor is precision balanced for long bearing life, and it revolves in the pump casing without metallic contact. Internal lubrication, frequent cause of gas contamination, is not employed in a Nash. Yet, these simple pumps maintain 75 lbs. pressure in a single stage, and afford capacities to 6 million cu. ft. per day in a single compact structure.

Nash Compressors have no valves, gears, pistons, sliding vanes or other enemies of long life. Compression is secured by an entirely different principle of operation, which offers important advantages often the answer to gas handling problems difficult with ordinary equipment.

Nash Compressors are compact and save space. They run without vibration, and compression is without pulsation. Because there are no internal wearing parts, maintenance is low. Service is assured by a nation-wide network of Engineering Service offices. Write for bulletins now.

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature Automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

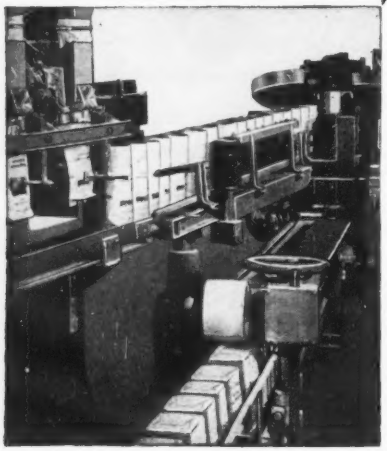
NASH ENGINEERING COMPANY

284 WILSON, SO. NORWALK, CONN.

THE BEMIS DELTASEAL BAG *PLUS* DELTASEAL PACKAGING EQUIPMENT

Equals

The most Economical, Efficient Package for Your Product



- Deltaseal® filling and closing is fast... mostly automatic... less handling.
- Deltaseal Bags have a neat, square, full-pack appearance... build easily into eye-catching displays.
- Crisp, brilliant Bemis printing on Deltaseals headlines your brand.
- Consumers like Deltaseal's exclusive Pull-Cut-Pour Spout.
- Bemis Packaging Specialists help you get the smoothest, most economical service from your Deltaseal System.

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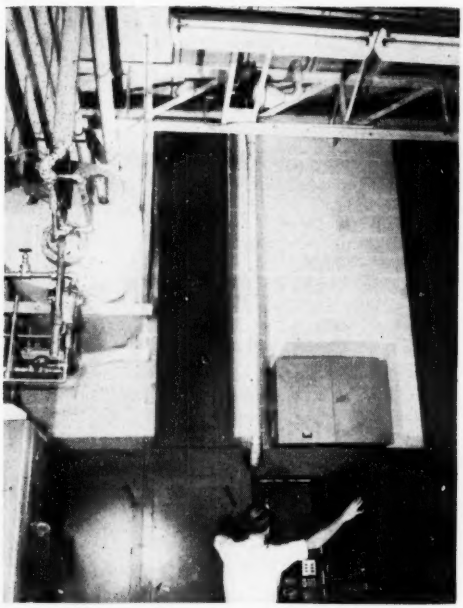
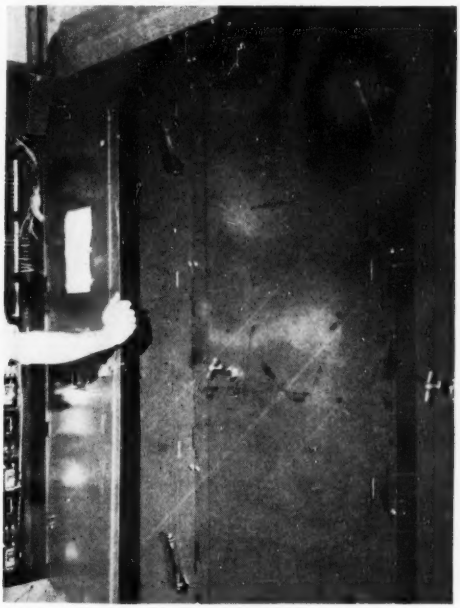
Bemis

BEMIS BRO BAG COMPANY

PRACTICAL IDEAS





Electrical Panels Made Safer

Two simple, practical, economical installations will contribute greatly in minimizing the hazard of control panels in plants that are vulnerable to explosions due to dust. Both of these preventives have been tested for a considerable time in the plant of Taylor Reed Co., Glenbrook, Conn.

Explosions must always be guarded against in food plants processing dry, dusty materials. They may be touched off in many ways. Not the least of the culprits is the electric spark. It can start the damage along any circuit, in a switch, or in the control panels.

These latter are frequently considered safe because they are usually removed from the "area of greatest danger." But any place in a plant handling dusty materials may at some time become dangerous.

Another reason for considering control panels safe is because they are enclosed. But they are not enclosed at the most dangerous time—when the access doors are swung aside to open or close a switch.

Food plant dust is like fine snow in a blizzard. Both have been found in places where they supposedly "couldn't be". Blizzard snow is carried to "inaccessible places" by a current of air—plant dust the same way. The only safe answer is a counter air current.

A blower (see left photo) is placed near the ceiling of the plant above the control panels to draw in dust-free air from the outside. The intake may be through the roof or a sidewall.

The pressure end of the blower discharges into the control panel housings, creating a pressurized atmosphere inside the panels. This forced-air discharges continually from the crevices. Thus, dust cannot enter, except when the panel box doors are opened.

Naturally, the internal pressure built up by the blower is reduced when a door is opened. And the longer it's open the less the blower effect. To promote retention of maximum pressure each panel door should be fitted with a set

$50 EXTRA FOR BEST ITEM

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD INDUSTRIES, 330 W. 42nd St., New York 18, N. Y.

JANUARY PRACTICAL IDEA voted best was "Liquid Caustic System Does It Better". Submitted by George Griffel, professional engineer, New York City, it describes advantages in changing from flake to liquid caustic soda for dairy plant cleaning.

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The newest advance in the art of flavoring and the science of seasoning.

Spisoresins are special extractions of dry spices possessing all the flavor qualities and values of dry spices. Spisoresins produce a more uniform and finer flavor than dry spices and are also more economical to use and handle. Spisoresins meet the requirements of the Bureau of Animal Industry.

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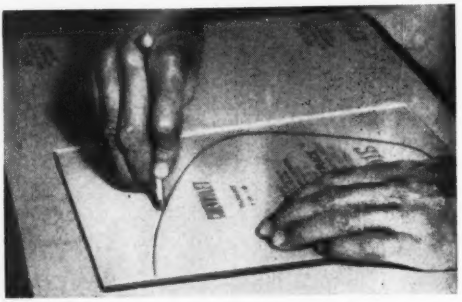
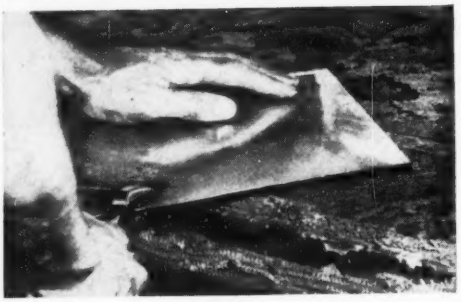
of springs (see closeup in right photo). These springs should be strong enough so that an operator must exert some pressure to open the door, and so that the door will close tightly when he releases it.

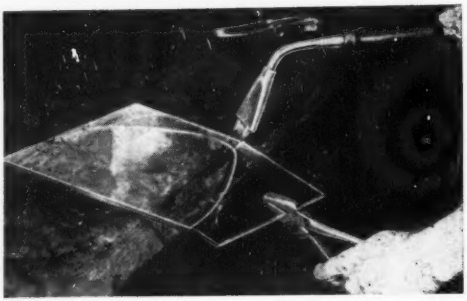
If these two practical, economical ideas are followed, the inside of the control box will remain clean and dust-free. The chance of an explosion from this source will be minimized.—*W. A. Reed, Plant Engineer, Taylor Reed Co., Glenbrook, Conn.*



Pattern cutting . . .



. . . snapping . . .



. . . and melting free

Fast Way to Cut Safety Glass

A quick and economical method for cutting safety glass is shown in the accompanying pictures. It requires only a little practice for the average operator to perform the job with ease.

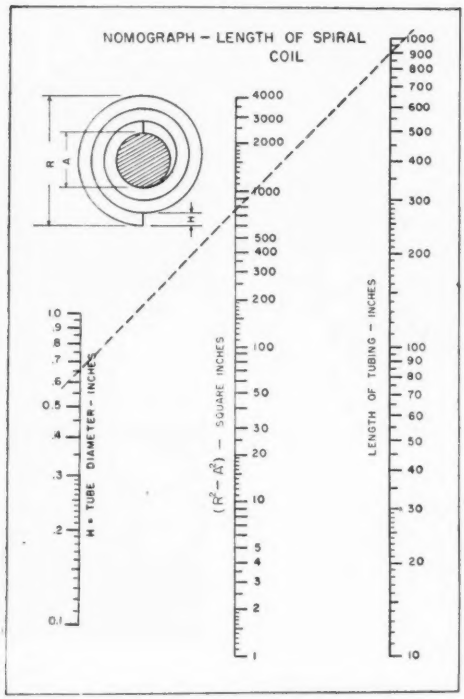
Safety or shatter-proof glass is so constructed that normal glass-cutting methods must be supplemented by a melting

process. The kind of safety glass used today is a laminated material consisting of two layers of polished plate glass that are separated by a thin layer of a special high-strength plastic.

Steps in the cutting method are as follows: First, place the safety glass over the pattern. Now draw the pattern on one side of the glass, and then turn the glass over and trace the outline again with a standard glass cutter (see top photo). Be sure to cut both layers of glass.

Then with a pair of pliers break the glass layers by applying pressure along the cut seam (middle photo). The plastic layer will hold the sections together.

Now use a torch with a paint burning stem to melt the plastic (lower photo shows a Prest-O-Lite paint burner being used). To complete the job, the sharp edges and rough spots should be ground off on a wheel. And you may polish further on a belt sander if you deem it necessary.—*Based upon item in "Tips", house organ of Linde Air Products Co., New York City.*



Speeds Spiral-Coil Computations

The next time you're faced with the tough job of figuring the length of a spiral cooling or heating coil needed in a specific installation, the above nomograph will prove an excellent aid.

How it's done is indicated by the example scribed on the graph, showing that if your tube dia. is 0.654 in. (first column) and the square inch figure is 759 (center column), then an extended line connecting the two will intersect the third column and give the answer: Length, 920 in.

In more detail, data at hand and the question involved are usually as follows: Given the outside dia. of the spiral coil, the dia. of the central arbor or inside opening, and

Don't take chances with product contamination. Use barrels and drums of Enduro—the lustrous metal that is inert to most chemical and food products—that is sanitary and easy to clean—that is resistant to corrosion—that is tough and strong—that is economical to use because it lasts so long.

The NILES Line offers a type and size for every chemical and food plant need. Write us for literature.

★ ★ ★

The solid head drum at the left and the patented Ringlox drum shown above are but two of the many styles in the complete NILES Line.

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REPUBLIC STEEL CORPORATION
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REPUBLIC STEEL

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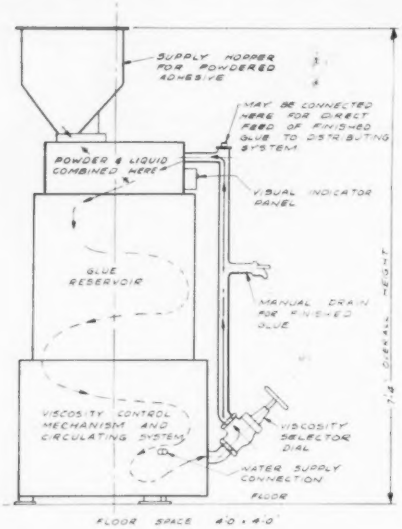
THIS NEW SYSTEM OF GLUE PREPARATION IS SIX WAYS BETTER!


SUPPLY HOPPER FOR POWDERED ADHESIVE
MAY BE CONNECTED HERE FOR DIRECT FEED OF FINISHED GLUE TO DISTRIBUTING SYSTEM
POWDER & LIQUID COMBINED HERE
VISUAL INDICATOR PANEL
GLUE RESERVOIR
MANUAL DRAIN FOR FINISHED GLUE
OVERALL HEIGHT 7'-6"
VISCOSITY CONTROL MECHANISM AND CIRCULATING SYSTEM
VISCOSITY SELECTOR DIAL
WATER SUPPLY CONNECTION
FLOOR
FLOOR SPACE 4'0" x 4'0"

The Triangle VISCO-MAT automatically converts dry adhesive into a liquid glue of exactly the right viscosity

YOU first put dry adhesive into the hopper at the top. Then you set the control dial to the consistency you need. The VISCO-MAT *automatically* combines the right amounts of adhesive and water to produce a liquid glue of exactly the right viscosity.

Just imagine what this new system means. No trial-and-error mixing . . . no mess . . . no drum handling . . . no waiting for glue to be prepared . . . no wasted batches. Furthermore, you save on paying freight for tap water and dry adhesive takes as much as 60% *less* storage volume than drums of liquid glue.

The VISCO-MAT system is so convincing, we want you to try it at our expense. You can put it to work in *your* plant by taking advantage of our . . .

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the outside dia. of the tubing, how can the length be calculated?

Assume tubing of length L and outside dia. H wound spirally about a center of dia. A. Now let n equal the number of laps around the arbor and R equal the outside dia. of the spirally wound coil. It is evident that

$$n = \frac{R - A}{2H}$$

And it can be shown that by arithmatical progression

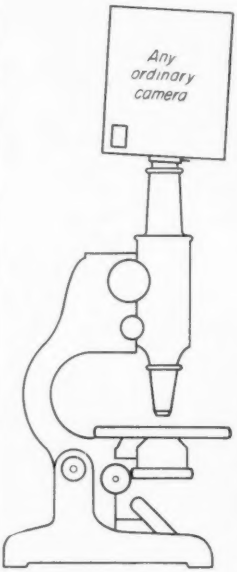
$$L = \frac{R^2 - A^2}{1.27H}$$

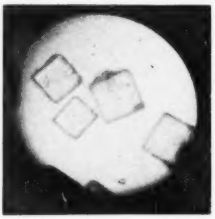
The nomograph is based on the above formula. In practice the values of R and A represent the mean outside and inside diameters, respectively.

Example: A cooling coil is to have a mean outside dia. (H) of 28 in. and the central arbor, or inside dia. that is A, equals 5 in. What length of $\frac{5}{8}$ in. tubing is required?

Solution: The outside dia. of $\frac{5}{8}$ in. copper tubing is 0.654 in. (first column). Next, we find that $R^2 - A^2 = 28^2 - 5^2 = 759$ sq. in. (center column).

Then, as shown earlier, a rule across the nomograph gives 920 in. as the length of tubing required.—*Joseph T. Hogan, 2713 N. Roman St., New Orleans 17, La.*





NaCl (mag. 45x)

Benzoic acid (mag. 25x)

Microphotos—With Box Camera

With the use of any conventional microscope and camera adequate microphotographs can be obtained.

In research and quality control of biological processes, miscroscopy is a useful tool. But the desire to make photo records of objects visible only under the miscroscope has too often gone unsatisfied because microphotographic equipment wasn't available.

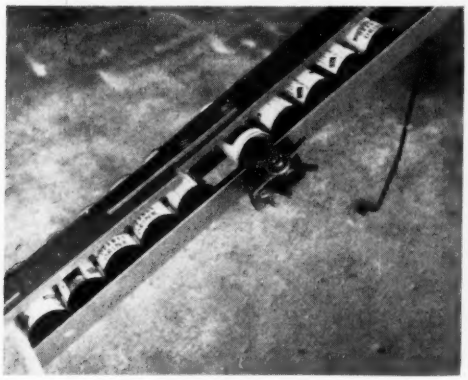
The author has circumvented this disadvantage—getting adequate microphotos using only a student microscope and a box camera. Laboratory personnel in the food industry should find the technic of value.

Since the virtual image of the object under the microscope is for practical purposes coming from a great distance, and is well defined at a range of short distances from the eye-

piece, than a camera with the lens focus set for infinity and the lens mounted adjacent to the eyepiece will be in adjustment to obtain a satisfactory picture.

In practice the microscope is first adjusted to give a good image of the subject using a strong light source. The camera is then mounted over the lens guard on the eyepiece top. Exposure should be from 5 to 10 sec. This time exposure is not critical, hence an operator can become very apt at approximating this with a little practice.

Sketch (p. 134) shows the technic, and accompanying photographs are samples of work. Top photo reveals salt (NaCl) crystals magnified 45 times. Lower photo is of benzoic acid—25x.—*Aloys L. Tapel, Univ. of Minnesota, St. Paul* 1.



Device Detects Inverted Cans

On our orange drink line, a simple device quickly spots any upended cans and halts operations until the trouble maker is removed.

The filling and closing machines on our 6 oz. line operate at 400 cans per minute. At this speed, the operator who feeds in the empties cannot prevent an occasional can slipping in upside down. And if an upended can reaches the filling and closing machines, production stops and repairs may be necessary.

A small star wheel is installed on the side of the can conveyor. In operation, the star rotates with the movement of the cans. A point on the wheel enters each can opening, the can edges clearing in the recesses between the points as the wheel turns.

But if a can is "wrong end to," the wheel points hit the bottom of the can (photo), and the movement of the line is then interrupted until the can is removed or reversed. —*E. F. Hansen, Production Manager, Nedick's, New York City.*

Plastic Vat-Cover Improves Sanitation

The old canvas cover for cottage cheese vats has been replaced by the plastic sheet in Islay's dairy plant in Pittsburgh, and better sanitation has resulted.

Measuring 6 x 18 ft., the new cover is made by heat-sealing a number of strips of polyethylene. In use, it is supported by wood strips placed across the top of the vat.

Being impermeable, the plastic cover does not absorb dirt, and it will not mold. It also has the important advantage of being easy to wash. Moreover health department officials endorse it.

faster-lower-cost cooling on

Dairy Products
Coffee Liquor
Water for Dough Mix
Pie Meats
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Carbonated Beverages
Wort
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Yeast

with Mojonnier Direct Refrigerant Equipment

Key reasons are that no intermediate heat transfer equipment is needed, and refrigerant temperatures can be set below product temperatures. If you have a cooling problem, find out how Mojonnier Direct Refrigerant Equipment can be applied to your product. Write:

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ZONE-CONTROL VATS

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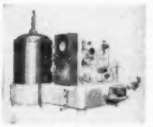
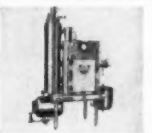
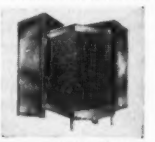
PRODUCERS COLD-WALL TANKS


CARBO-COOLERS


VIS-A-FLOW COOLERS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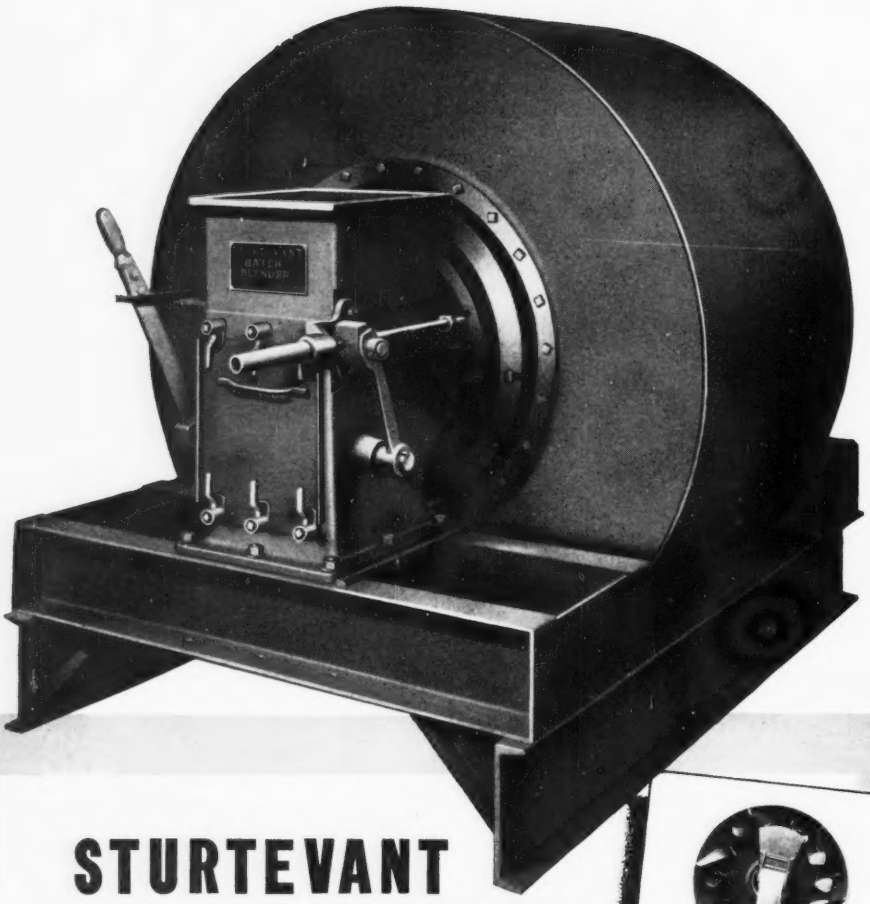

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Thoroughly Blend Substances into an Inseparable Mass

The 4-Way Mixing Action of the Sturtevant Dustless Blenders thoroughly mixes two or more substances into an inseparable whole . . . every part of which is the same analysis. Single receiving and discharging opening insures tight sealing during mixing process. "Open-door" accessibility permits thorough cleaning. The fast, accurate mixing operation increases output . . . cuts mixing costs. Available in many sizes with mixing capacities from ¼ ton to 75 tons per hour. Write for information and catalog.

Receiving — The ingredients to be mixed enter the mixing chamber of drums through a chute. Note scoops which carry up and dump the ingredients as drum rotates assuring a more uniform mix.

Discharging — Throwing a lever closes the inlet and mixer is in discharging position. The completely mixed materials drop off the lifting scoops and discharge through chute without segregation of ingredients.

The Sturtevant Mill Company

106-A Clayton Street, Boston 22, Massachusetts

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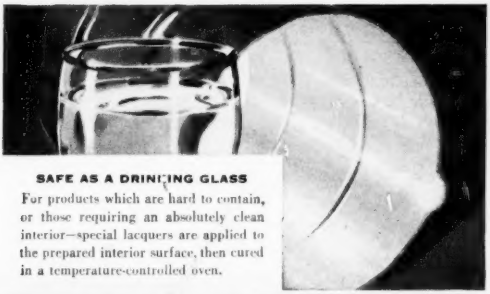
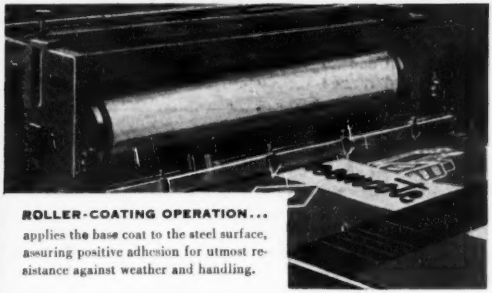
BIG CONTAINERS NOW "TRAVELING BILLBOARDS"

Consider the merchandising opportunities this remarkable new package presents! The durable and lustrous finish of Rheemcote drums, lithographed with *your* distinctive colors, trademarks and designs, will billboard your product and name before the eyes of the world.



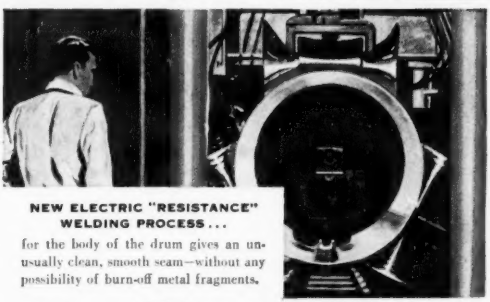
SAFE AS A DRINKING GLASS

For products which are hard to contain, or those requiring an absolutely clean interior—special lacquers are applied to the prepared interior surface, then cured in a temperature-controlled oven.



ROLLER-COATING OPERATION...

applies the base coat to the steel surface, assuring positive adhesion for utmost resistance against weather and handling.



NEW ELECTRIC "RESISTANCE" WELDING PROCESS...

for the body of the drum gives an unusually clean, smooth seam—without any possibility of burn-off metal fragments.

After many years of research, the Rheem Manufacturing Company, world's largest maker of steel shipping containers, is proud to have developed the Rheemcote Process in this, its 25th year of service to industry.

For a *free*, descriptive, beautifully illustrated brochure on this important contribution to marketing—write or wire Rheem today.

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Plants and Affiliates Throughout The World

Rely on Rheem to Deliver Your Goods..and Goodwill

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1 **APPLES** are dumped onto belt and go under brush (right) that spreads fruit.

2 **HERE,** apples are inspected and then automatically graded on 2¼-in. mesh screens.

UNFOLD HERE

Mechanized Apple Butter and Jelly Lines

Including Vinegar, Juice-Concentrating and Pomace-Drying Operations

HIGH EFFICIENCY keynotes the apple butter, jelly, vinegar, juice-concentrating, and pomace-drying lines at the plant of Knouse Foods Cooperative, Inc., Peach Glen, Pa., where daily 24,000 bu. of fruit are handled during season.

Initial steps common to all operations are leveling, inspecting, and grading—depicted at Points 1 and 2. Leveled apples are conveyed along an inspection station, where girls reject imperfect fruit. Good apples are then screened into small and large sizes. The large apples are used for sauce and canned slices (p. 136-139, Feb. FI), while the small fruit is made into butter, jelly, vinegar, juice, and dried pomace, as shown here.

Slices and Sauce, Too—In No. 26

For process-line details on the manufacture of apple-pie slices and sauce—the other two of Knouse's seven apple products—see our preceding FI Picture-Flowsheet No. 26 (p. 136-139, Feb. FI).

In addition, there's a special feature, "Makes Big Strides In Apple Processing," in the same issue (p. 111). It relates how Knouse's enterprising management brought this operation up to national ranking within only two short years.

Washing—Point 3—is a two-step operation, with the apples traveling through two tanks. Spray residues are removed from the fruit in the first tank (containing a 1 percent solution of HCl), and acid is rinsed from the fruit in the second tank (plain water).

Now to the actual production of the butter: Apples are flight-conveyed to a hammer mill. Next, the ground fruit goes through a continuous, live-steam cooker, then through a pulper that takes out skins and seeds.

Digesting is the succeeding step. Here, apple pulp goes into 250-bu. steam-coil-fitted tanks—Point 4—and is cooked for 1 hr. under 30 psi. From these digesters, concentrated pulp is pumped into steam-jacketed kettles, where spices, sugar, and fruit acids are added, and the mixture is cooked to the desired soluble-solids content. Apple butter then goes through a finisher.

From here on, the butter line doubles for jelly. Only difference: In apple jelly making, concentrated apple juice, water, sugar, and pectin are introduced into the steam-jacketed kettles, with the finishing machine by-passed.

Apple jellies containing elderberry, cherry, raspberry, and grape juices are manufactured here, too.

Apple butter and jellies later go to a machine—Point 7—that fills six jars at a time. Filler output: 125 jars per min.

Jars of butter or jelly then go to an automatic capping machine, and next are fed to a continuous cooler (Point 8). Traveling on a 40-ft. long wire-mesh belt at 2 ft. per min., jars are spray-cooled with cold water to 100 deg. F. or below. Finally, jars are automatically labeled and cased.

In manufacture of apple vinegar, preparation of the juice for fermentation is the first step. Acid-washed, small apples are crushed in a hammer mill and hydraulically pressed under 3,000 psi. (Point 9).

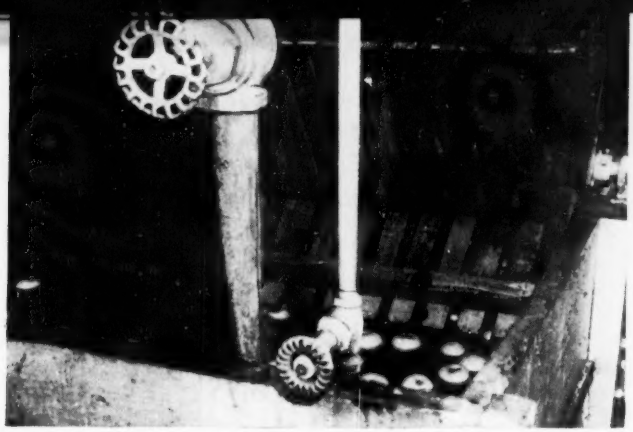
Fermentation follows, juice being pasteurized before it is pumped into fermentation vats. Pure yeast is introduced and fermentation proceeds until maximum amount of alcohol is produced.

Generating is the next operation (Point 10). Vinegar stock is now filtered, heated to 85 deg. F., inoculated with acetobacter organisms, and pumped into large wooden generating tanks. At this stage, alcohol is converted into acetic acid as the stock percolates through the generators.

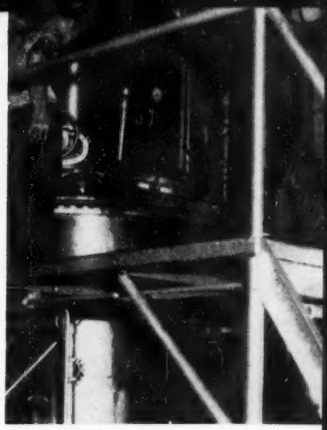
Aging is the succeeding step. Vinegar is pumped into 30,000 gal. aging vats, where it is permitted to mellow. Then the vinegar is pasteurized and finally filled into quart bottles and capped at the rate of 60 per min.

Juice not used for vinegar is concentrated in a double-effect evaporator (Point 11). After pectin is removed, juice is filtered and then goes to a vacuum evaporator. Here, the juice Brix is raised from about 12 to 68. Juice concentrate is then filled in drums, and later used to make jellies.

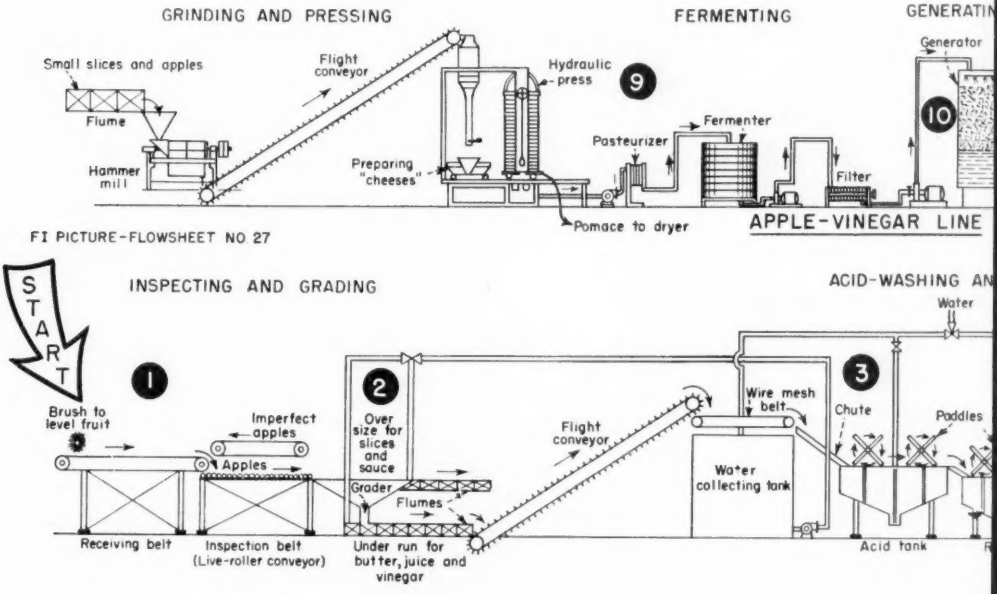
Pomace remaining from pressing operations is dried in a 6 by 24-ft. unit that rotates at 3 rpm. Capacity of the dryer (Point 12) is 1,000 lb. of dried pomace per hour. Bagged pomace is shipped to pectin-processing plants.



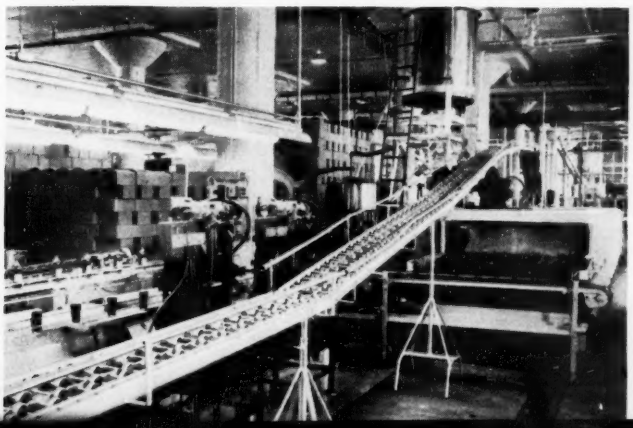
3 **IN ACID BATH,** spray residues are removed from apples as rotary paddles carry fruit through tank. Next, acid is rinsed from apples in another tank.



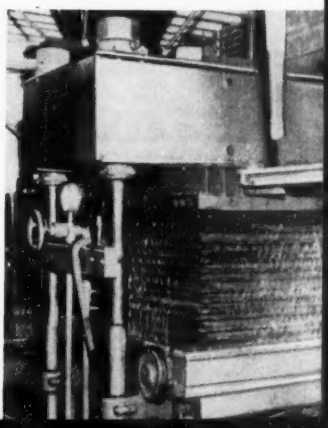
4 **SPECIAL** stainless steel digesting t apple pulp. Cooking is for approxim

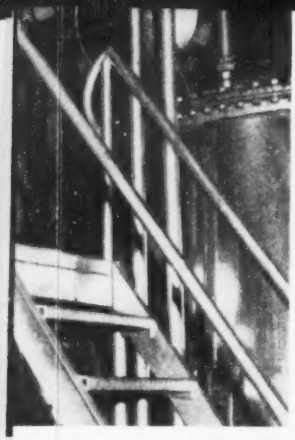


8 **CONTINUOUS COOLER** sprays sealed jars of butter or jelly with cold water. Product temperature is down to 100 deg. F. before jars go to labelers.

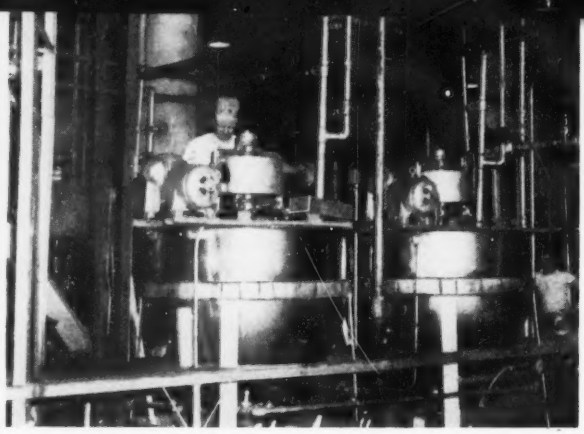


9 **HYDRAULIC PRESS** squeezes juice coming from hammer mill.



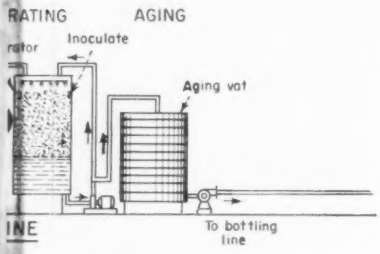


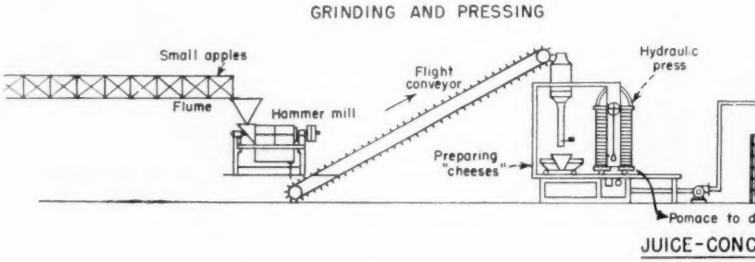
ting tanks are used to concentrate
roximately 1 hr. under 30 psi.

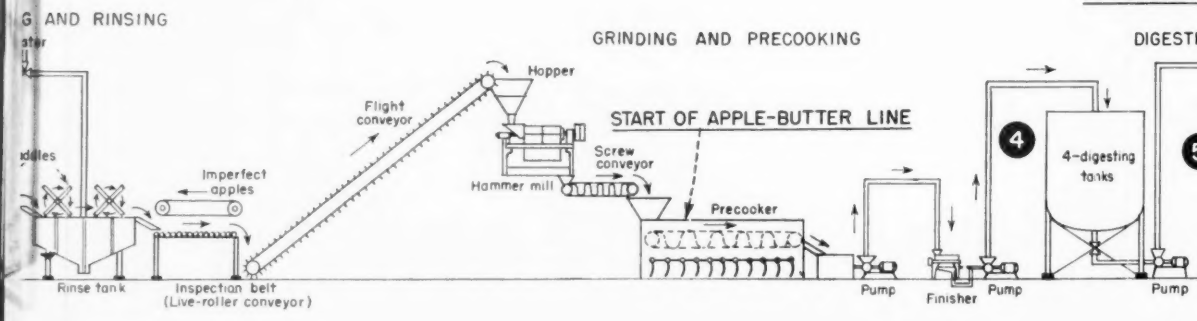


5 **STEAM-JACKETED** kettles, with vertical mixing paddles, cook apple butter, also jellies, to proper consistency. Each kettle holds 150 gal.

6 **SCREW-TYPE PULPER**
hot apple butter comin



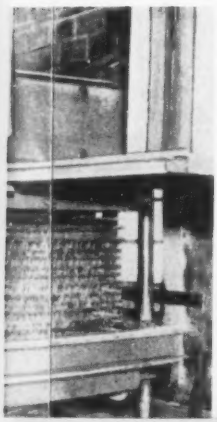


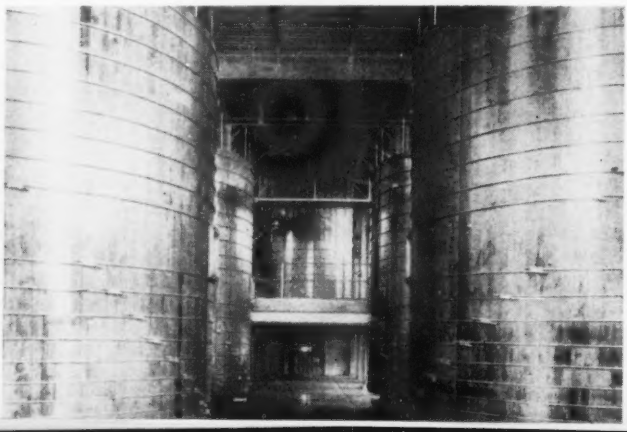


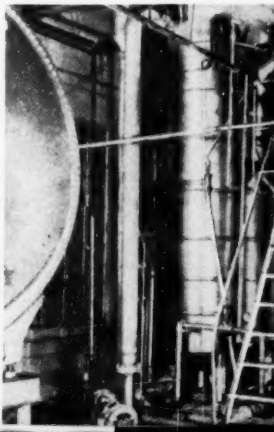
juice from crushed apples

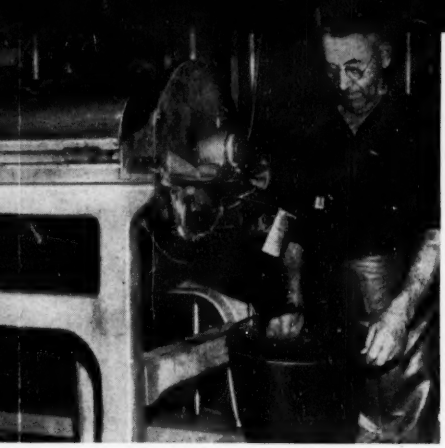
10 **VINEGAR-GENERATING** plant is the latest. Temperatures in each tank are recorded by electronic indicators.

11 **EVAPORATOR** concentrates
Apple juice concentrate is the

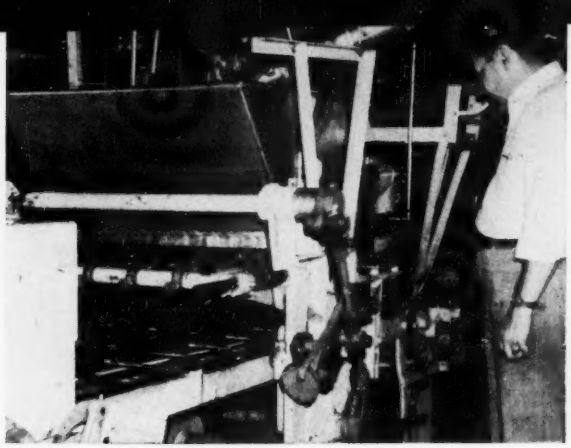




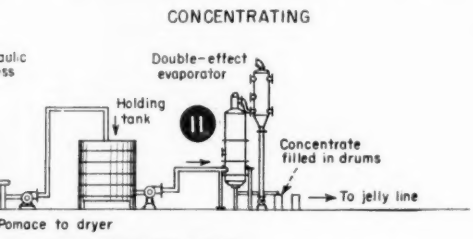


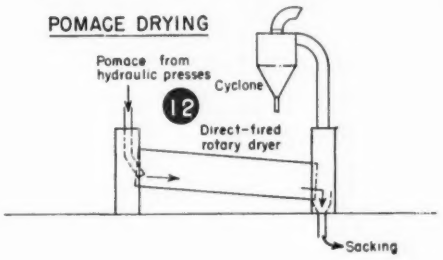


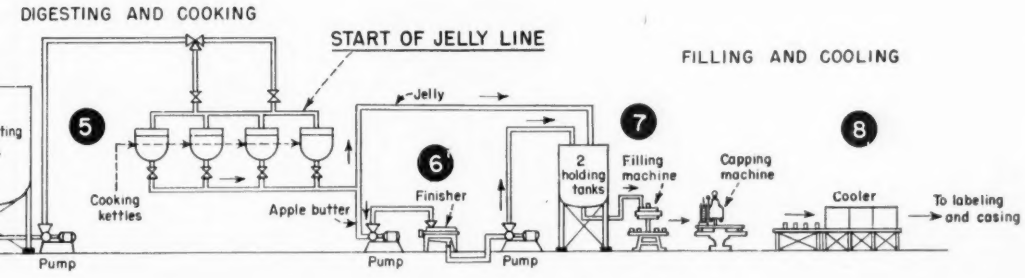
PULPER continuously removes skins and seeds from ter coming from the stainless-steel cooking kettles.



7 PLUNGER-TYPE FILLER can turn out 125 jars of apple butter or jelly per minute. Machine fills six jars at a time.

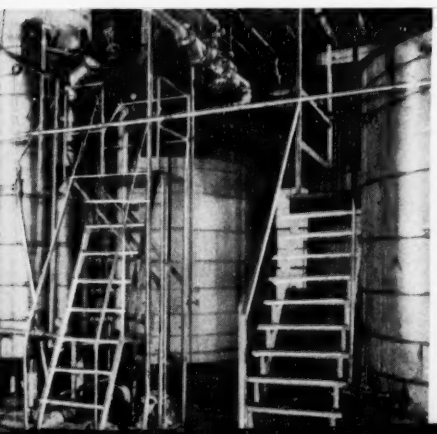


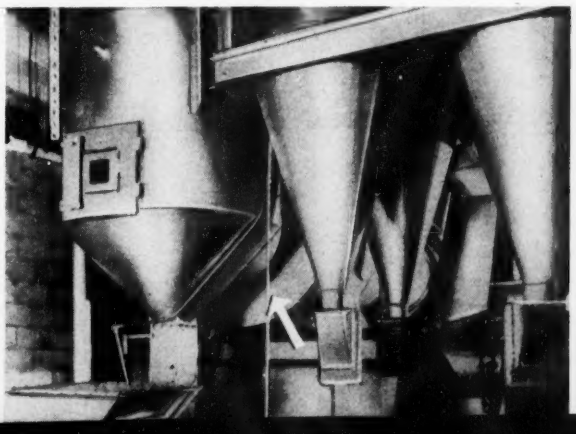




ncentrates juice coming from hydraulic presses. trate is then put up in drums, later to make jellies.

12 DRYER (arrow) removes excess moisture from pomace leaving the presses. Output is 1,000 lb. of dried pomace per hour.





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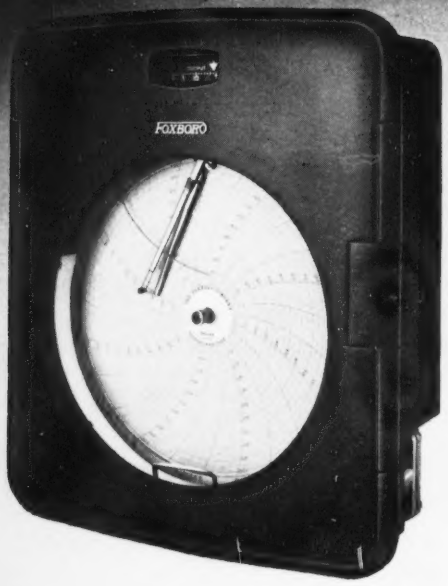

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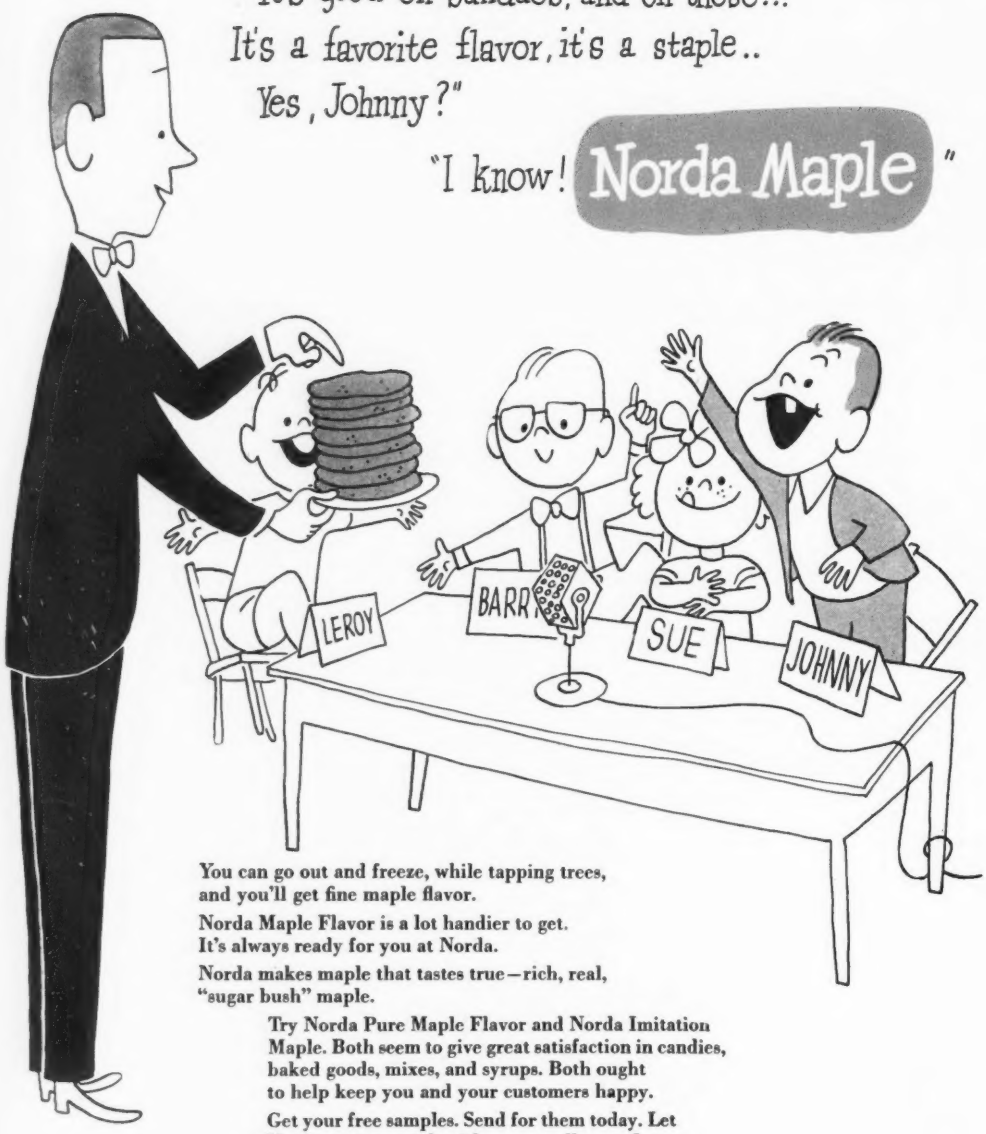

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The Defense Production Problem

To win out in the struggle for freedom into which the Russian Communists have plunged us we must do at least four things. We must:

1. Speedily carry through a program of defense production which, at its peak, is scheduled to take about one-fifth of our national output.

2. Pay for this program as we go, by methods that will enable us to maintain the effort for an indefinite period – as long as may be necessary to insure peace and security.

3. Manage intelligently and endure intelligently a set of direct government controls which, in certain critical departments, will put our national economy for a time in a hateful straight jacket.

4. See that these emergency controls are not fastened upon us permanently thereby presenting to our Soviet antagonists a major victory for collectivism on our home front.

This is the first of a series of editorials designed to present in the simplest terms these key aspects of our struggle to preserve our free institutions.

A Staggering Task

The magnitude of the defense production job staggers the imagination. Over the next year it calls for a larger volume of goods and services than the 20 million people of the states of New York and New Jersey will use for all purposes. The (London) TIMES has observed that, taken alone, the increase of defense expenditures which has been budgeted for the federal government's coming fiscal year (about $30 billion) "is in itself not far short of the total national income of the United Kingdom."

Yet so powerful is the production machine created by free American enterprise that, at the scheduled peak, the defense program will take only about one-fifth of our total national output. The exact form and dimensions of the program will, of course, be hammered out on the anvil of public and congressional debate. But the President's recent estimate of an annual rate of expenditure of $45-55 billion for defense by the end of this year may well turn out to be somewhere near right.

To meet even these vast requirements of defense production we are in better shape technically than we were when we started to prepare for World War II. Our industrial plant and equipment is greatly improved. Over $65 billion has been invested in it since V-J Day. Our working force is about eight million larger than it was ten years ago and much better trained.

The difficulty, and it is a very serious economic difficulty, is that we must fit the defense program into a productive machine that has been almost fully extended to meet the needs of a booming civilian demand. The present plan is to step up defense production during 1951 from about 7% to about 18% of our total national output. Because there is relatively little slack in our economy, this means that civilian production at the outset must

be cut back as defense production is stepped up.

The cut-back of civilian goods must be especially severe in the case of products made of metal. This is particularly true of goods that use scarce strategic metals such as aluminum and copper. Of our total defense production program, about half will go for "military hardware" – airplanes, guns, munitions, tanks and the machinery to make them. By the end of 1951 defense requirements are scheduled to absorb most of the metalworking production not required for essential construction and for the spare parts necessary to keep existing equipment running. For a time at least, there will be a sharp cut in the supply of new metal products available to civilian consumers. The defense squeeze on both materials and manpower will also cut sharply into housing and other civilian construction.

For the Short Run — Controls

In the short run there is no answer to the problem of meeting defense production schedules except controls. Sharp reduction of non-defense expenditures by government is essential and would help greatly. But the basic fact is that we cannot increase our total production fast enough to meet immediately both civilian and defense requirements.

Controls are needed, therefore, to switch resources from civilian to defense production, and at the same time prevent the combined demand for critical products from sending prices right through the roof. In the case of many scarce strategic metals such as nickel, copper and cobalt, the task of increasing output is especially difficult because our limited supplies are tucked away deep in the earth in many quarters of the globe.

For the longer pull – and that is what we must face – there is another answer to our defense production problem that is infinitely better than controls. And this time, in contrast to World War II, it is all-important that we get the right answer to our defense production problem for the longer pull and that we get it right now. In World War II we geared our economy to meet the requirements of a relatively short and decisive conflict. Now our leaders, however they may differ as to methods, are well agreed that, at best, "the conditions under which we labor may persist for ten, fifteen or twenty years." That is General Bradley's phrase.

For the Long Pull — More and Better Production

For this longer pull, the constructive answer to our problem of defense production is clearly more and more efficient production all along the line. It is true that overall we now have the most efficient industrial establishment in the world. But, even so, much of it is far short of attainable efficiency. Some plants using up-to-date equipment and methods are as much as six times more efficient than others in the same industry that are lagging in modernization.

Our Director of Mobilization, Charles E. Wilson, has clearly in mind this problem of increasing our industrial efficiency. The first step in his job, as he conceives it, is to get out an adequate supply of weapons to equip the army, navy, and air forces already mobilized or in process of organization by us and our allies. The second step is to make sure of our capacity to produce both "military hardware" to meet any increased requirements and the maximum possible volume of goods for civilian use.

In concentrating on more and more efficient production, Mr. Wilson is squarely on the beam. We can attain his objective – by sustained effort on the part of each one of us backed by up-to-date industrial methods and equipment.

If we do that, we can maintain indefinitely an adequate defense effort and at the same time enjoy a standard of living higher than any other in the world.

Additional production and more efficient production are our surest safeguards against our two most menacing enemies on the home front – the deadly inflation that can destroy our free economy, and the strangling government controls that can destroy our political freedom.

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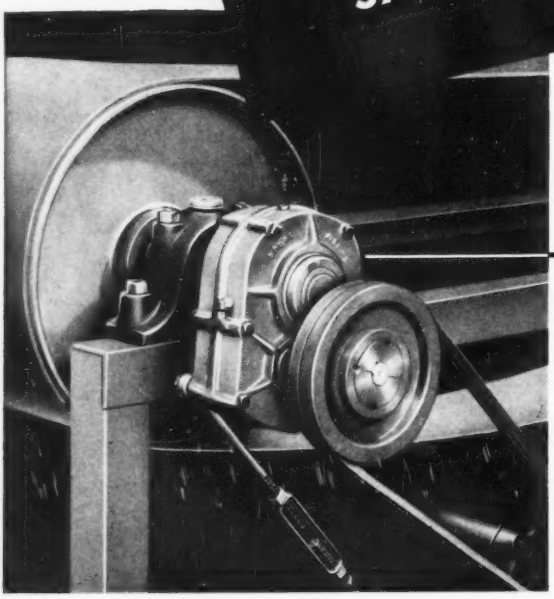

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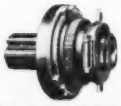

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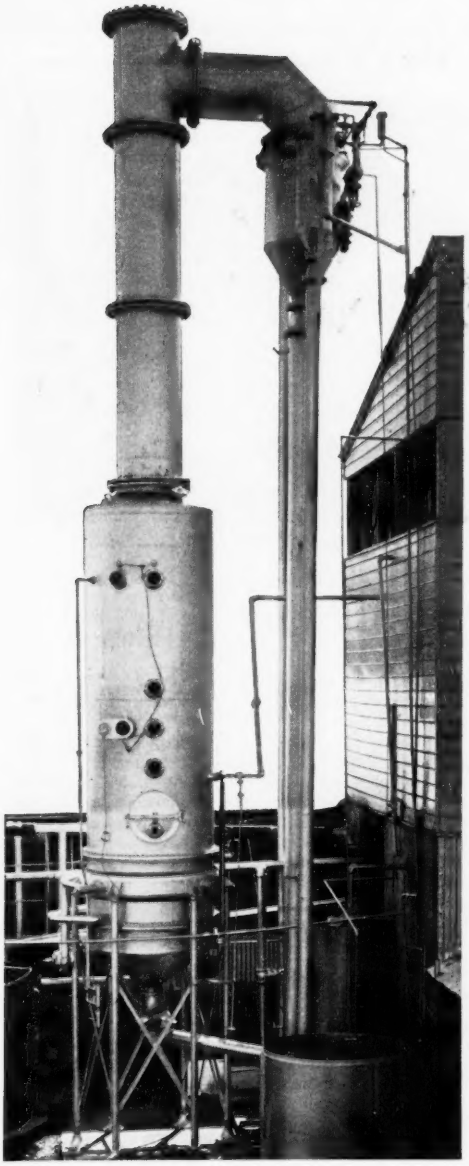

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Food Equipment News

FILLED: Spacious carrier

EMPTY: Saves Room

Insulated Frozen-Food Shipper Needs No Ice

Through use of a new insulated, lightweight, collapsible food carrier or shipper, delivery costs of frozen foods are reported sharply reduced.

The insulated shipper keeps foods frozen without dry ice or other refrigerants, or need for protection in regrigerated trucks.

In actual field use—cited by Clinton Foods Inc., New York—the new carrier has kept foods frozen over periods of more than 24 hrs. in temperatures up to 95 deg. F. and also prevented condensation under high humidity conditions.

Handling is easy

Not only is the shipper reported to permit lower cost delivery of frozen foods without refrigerants from warehouses to retail outlets, but it is also stated to enable stores to stack incoming frozen food shipments in unrefrigerated storerooms for short periods when freezer space is full.

Shipper holds from 100-120 lb. of frozen merchandise. Empty, it weighs only 14 lb. It occupies a 20- x 24-in. floor space. When full, it is 16-in. deep, and it collapses when empty to a compact 6-in. depth.

In contrast, a conventional frozen-food carrier of equivalent 100-lb. capacity weighs nearly 60 lb. and takes up 8.4 cu. ft. of space, full or empty. New carrier occupies 4.3 cu. ft. full and 1.4 cu. ft. collapsed empty.

Shipper's outer material is flexible Neoprene-impregnated fabric. Zipper fastenings extend along the center of ends and top. Carrier handles and fastener straps are provided.

Fiberglas Aerocar, an efficient insulating material widely used for "cold" applications, lines the carrier's top and sides. Two 1-in. thick blankets of the insulation are inside the coated canvas and are separated by a vapor barrier of plastic film.

The base is built around an insulating sheet of Onazote cellular rubber, faced top and bottom with plywood.

The shipper was developed cooperatively by Snow Crop Marketers Division of Clinton Foods, Inc., Owens-Corning Fiberglas Corp., British Zylonite Co., and Weber-Washburn Co. It is available to all frozen food distributors and dealers.

The carrier is not limited to the frozen-foods operators. It is also suitable for use by other food processors, distributors, chain stores, restaurants, airlines—in fact any who may find its features advantageous. Removable inner plastic liners can also be furnished where desired.—*Weber-Washburn Co., 42 Broadway New York City.*

New Shaft-Seal Eliminates Leakage

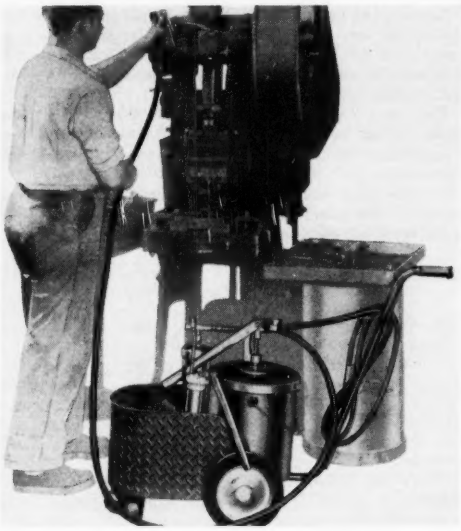
A new type shaft-seal has been developed to eliminate leakage on process pumps.

Known as "Equiseal", its sleeve is radially vaned and rotates with the shaft to create a pressure that equalizes the suction pressure. As a result, atmospheric pressure exists on the pressure side of the stuffing box as well as outside to eliminate leakage.

New stuffing box is not sensitive to wear or close adjustment. Employing no complicated mechanism, it is reported able to prevent leakage even when handling viscous liquids or those with solids in suspension. Packing can be removed while pump is operating on positive suction head without leakage, even though there is a direct passage from pump suction to atmosphere.

To simplify assembly and maintenance, the baffle in the suction passage is made an integral part of the wearing plate.

New seal has been designed for use on all of maker's process pumps, with suctions heads up to 15 ft. at 1,750 rpm. or 6 ft. at 1,150 rpm.—*Allis-Chalmers, Milwaukee.*



Compact Grease Rig Is Portable

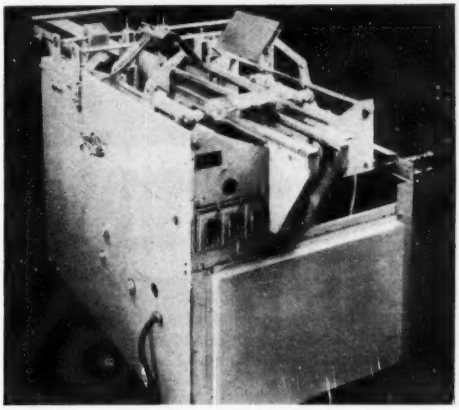
Lubricants are readily dispensed to industrial bearings with use of a new lube service cart.

Compact and highly maneuverable, this two-wheeled grease rig moves rapidly along plant aisles and between closely placed production machines. Since all grease and oil equipment on the rig is removable, even remotely located machines inaccessible to the cart, can be greased.

When stocked for general purpose lubrication (and specialized grease if desired), the cart is a completely self-contained unit requiring no air supply. All equipment is hand operated. High pressure or volume greasing can be handled easily and quickly. An oil pump dispenses oil either in single shots or in a steady stream. Cart capacity permits hundreds of bearings to be greased without returning to the lube supply room.

Two models are available. One dispenses grease from a bucket-type unit of 30 lb. capacity. The other pumps from a 25 lb. to 40 lb. refinery-filled pail. Each has a 10 ft. high pressure hose with control valve. Both models feature high pressure and volume greasing.

Also included on the cart are an oil pump (in a 2 qt. container) with a 10 ft. dispensing hose and gun; a 1-lb. lever gun; and a ½-pt. pistol oiler. Hooks on handle keep hoses off floor. Cart has two 10-in. rubber-tired wheels and a large removable front caster. Front of cart has hinged cover, serves as storage space for tools, adapters, rags, and similar needs. Cover makes a convenient seat while greasing low bearings.—*Gray Co., Inc.,* 200 *Graco Square, Minneapolis* 13.



Tightly Film-Wraps Many Meats

Developed primarily for cellophane wrapping of 1-lb. or less of loose frankfurters, new wrapping machine has been found adaptable to sliced luncheon meats, bacon, and other such foods. It can wrap 35 packages a minute.

Franks are wrapped without a tray or box. A tight wrap is secured by compressing the ends of the franks slightly as the cellophane is drawn down and underneath. This does not injure them in any way, and is helpful in lining them up endwise. Infeed is designed to receive pre-banded packages.

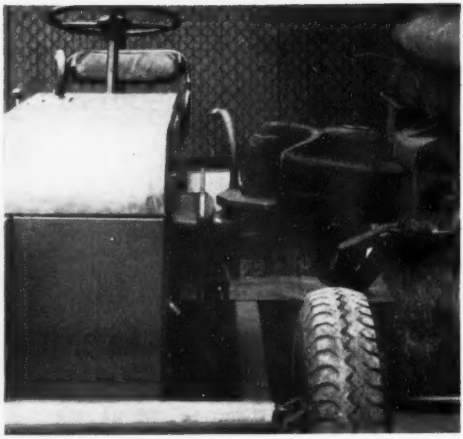
Unit is adjustable for packages from 3½ to 16 in. long, 1 to 10 in. wide, and ¼ to 5 in. high. Overall machine dimensions are 32 x 89 in.—*Miller Wrapping & Sealing Machine Co.,* 18 *S. Clinton St., Chicago* 6.

DON'T MISS THESE . . .

Railway car handling is speeded with unit which travels on either track or ground.....Page 150
Dry chemical fire protection system is automatically operated by heat-actuated mechanism.....Page 150
7-Day temperature recorder is self-contained thermometer for refrigerated trucks, cars.....Page 158
Jacketed alloy valves provide efficient heating for fluids that solidify.....Page 161

AND WATCH FOR . . .

Automatic instrument that eases laboratory work by handling routine titrations .....April FE
Combination packaging-weighing produce unit has accuracy within one piece.....April FE



Speeds Railway Car Handling

Versatility and efficiency in the hauling, spotting, and switching of railway cars are provided by the new Trackmobile.

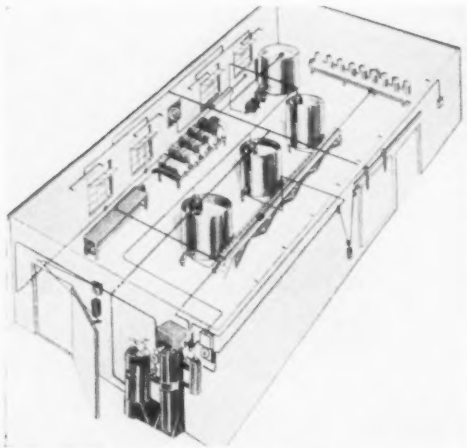
Small and compact, the gasoline powered unit makes ingenious use of hydraulic jacking power for two features which maker's engineers believe can revolutionize yard and in-plant methods of railway car handling.

Cited are its ability (1) to travel either on the railway track or on the ground and (2) to change from one to the other in just 30 sec. The hydraulic jacking power is also uniquely employed to develop an adhesive force which is stated to give the 6,000-lb. unit a pulling power greater than that of plant locomotives which weigh much more.

Unit couples to any standard railway car (left photo). When coupled (right photo), the hydraulic jack raises the special coupler, forcing the unit down on the track. A portion of the car's weight is thus transferred onto the Trackmobile, enabling it to develop a maximum draw-bar pull of 7,350 lb.

Unit uses four standard AAR steel wheels for track travel. Four rubber-tired wheels for ground travel are hydraulically retracted when the unit is positioned for track operation.

One operator easily controls transfer from one set of wheels to the other. Maximum ground speed is 25 mph; track speed varies with load—*Whiting Corp., Harvey, Ill.*



Dry Chemical Fire Protection System

The first fire-protection system using dry chemicals as an extinguishing agent has been developed. It is automatically operated by means of a heat-actuated mechanism.

When the fire starts and temperature increases, air expands within the mechanism. This trips a nitrogen cylinder release, pressurizing the dry chemical container. Dry chemical is then discharged, through strategically located distribution bends onto the fire area.

Automatic controls can be added to the system to close doors, windows, ventilation ducts, and to operate valves on pipes carrying flammable liquids. Electric controls can be included to shut off motors and fans, sound alarms, and transmit signals to central stations or fire alarm headquarters.

These dry chemical type systems are specially recommended for ovens, dryers, flammable liquid storage tanks and rooms, and pumping stations.—*Ansul Chemical Co., Marinette, Wis.*

Steam Turbine-Generator Units

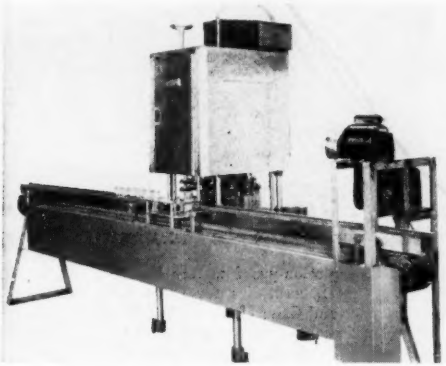
A new line of WA-Series steam turbine-generator units has been announced. Ratings range from 500 to 7,500 kw.

The new multi-stage, all-impulse steam turbine-generators are reported to afford the maximum economies that can be realized with steam turbine power.

They are high speed, compact, streamlined units, and being steam turbine driven, can operate with economical regenerative feedwater heating cycles. Of particular interest to the food industry is the fact that they can also be tied-in thermodynamically to provide a steam-power balance where low pressure process steam is utilized. Governor and regulating characteristics provide for paralleling with existing units and tie-lines.

Design incorporates the simplicity of three-bearing unit construction with quality multi-stage impulse turbine, hous-

ing type generator, and direct-connected exciter construction. Several features of WA-Series design include forged rotor and bucket wheel disks, chrome steel buckets, reliable all-labyrinth type shaft gland and interstage packing, and enclosed oil-piping above foundation in both generator and turbine.—*Allis Chalmers, S. 70th St., Milwaukee.*



Briner Fills 70 Jars Per Min.

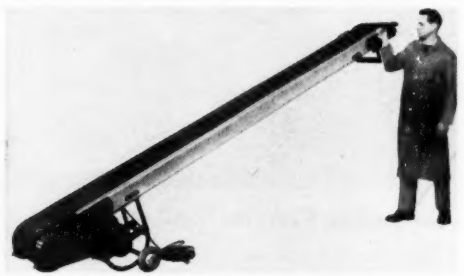
This new 12-spout, fully automatic rotary vacuum brining machine can fill jars of olives, pickles, and onions with brine, at the rate of 70 per min.

Filler may also be employed for syruping marachino cherries and other foods.

Tests conducted on this unit evidenced its ability to take a wide variety of container sizes—from 1 to 32 oz. Consistently, brine fed into jars reached the specified level of ⅛ in. from the top. A specially designed vibrationless, steel-link chain belt conveyor prevents shaking of jars, eliminating spillage.

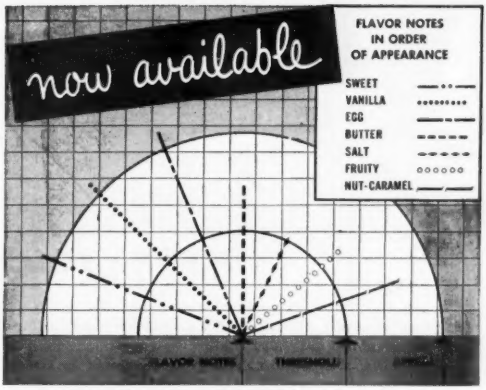
To assure maximum sanitation and safeguard the machine from the corrosive action of the brine, all parts are constructed of stainless steel. The overhead drive mechanism provides ample open area on the floor for cleaning. And the tank is removable for thorough sterilization.

Machines can be provided in 15, 20, 30 and 40-spout sizes. On the larger machines, containers up to gallon jugs can be filled at high speeds.—*MRM Company, Inc., 191 Berry St., Brooklyn, N. Y.*



Easily Rolled From One Job to Next

This lightweight, corrosion-resistant, power belt conveyor, called the Aluminum Stevedore, can be rolled from one job to the next as easily as a wheelbarrow. Two-way belt travel permits use for both loading and unloading. Standard belt speed is 94 fpm.—*The Rapids-Standard Co., Inc. Grand Rapids 2, Mich.*



New ORGANOLEPTIC PROFILE Report on Vanilla Flavoring

Latest scientific method for evaluating flavor results used to test pure vanilla, vanillin-coumarin solution, and Aromanilla.

Send for your copy of the complete report giving a step by step account of the tests conducted by Foster D. Snell, well known New York research organization. You'll see how skilled taste panels evaluate flavors according to:

1. characteristic notes of aroma and flavor
2. the order of appearance of those notes
3. their strength
4. the total flavor effect

You'll see how these notes are diagrammed so that the flavor results are shown in easy-to-grasp pictorial form.

This Study represents a serious and sincere effort on the part of The Aromanilla Company to help bring more scientific methods to bear on this one problem of ingredient selection that lies within its province. If you are interested, we will be glad to send a copy.

FREE copies of this Organoleptic Profile report on vanilla flavoring available to all in the Food Industry interested in more scientific methods of ingredient evaluation.

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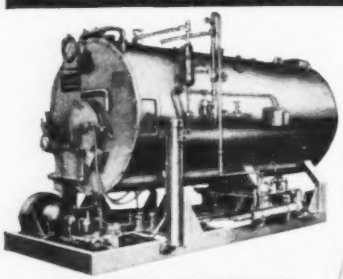

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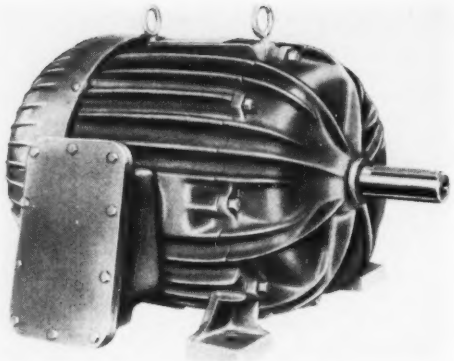


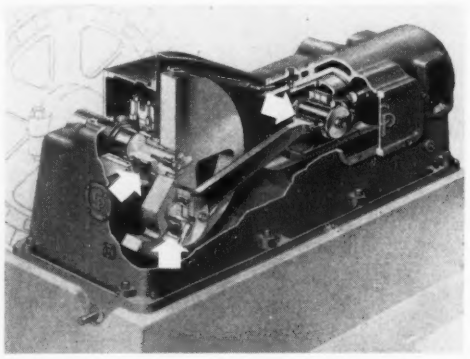
Motors for Hazardous Locations

Line of explosion-proof motors has been approved by Underwriters' Laboratories for Class I, Group D; Class II, Group F; and Class II, Group D hazardous locations.

Of totally enclosed design and fan-cooled, these motors are accepted for use in atmospheres containing flour, starch or grain dust, alcohol, natural gas—or anywhere else explosions are a hazard.

Motor is an adaptation of maker's sealed power design. Cooling air is directed by an external fan over fins that are cast into the corrosion-resistant gray cast iron frame. There are no internal passages to clog and cause overheating.

Bearings are double-row width, prelubricated and sealed and stated to require no attention for at least five years. The conduit box has large protective flange surfaces. Motor leads are sealed in the frame, permitting rotation of the conduit box to any of four positions 90 deg. apart. The explosion-proof design is available in NEMA frames 364 through 505.—*Crocker-Wheeler Div., Elliott Co., Ampere, N. J.*



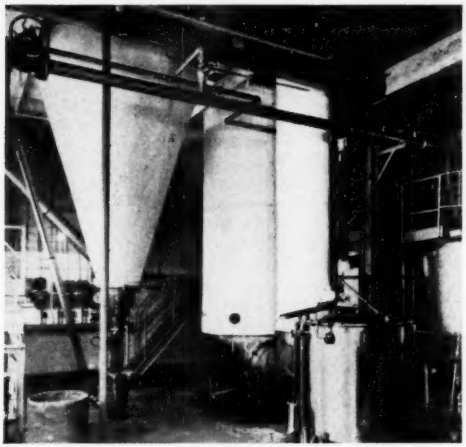
Compressor Features Roller Bearings

Horizontal duplex compressors are now available with anti-friction roller bearings throughout instead of conventional sleeve-type bearings in the running gear. Spherical roller main bearings support the crankshaft and are also used in the crankhead end of the connecting rod.

It was not until the recent development of the oil injection system of bearing removal that roller bearings were practical here.

The roller bearings are self-adjusting. They are stated

to have a life expectancy equal to the life of the compressor itself. Pounding of bearings due to misalignment is reported eliminated. Full-flood lubrication is ideal for this type bearing. One-piece crank disks and connecting rods can be used. Removal and replacement can be accomplished with ordinary hand tools and a portable hydraulic pump.—*Chicago Pneumatic Tool Co., 6 E. 44 St., New York 17.*



Economical Dryer for Small Dairies

Capable of operating economically at comparatively low production volume is a new milk-drying system.

It comprises two units reported to have proved successful in several dairy installations. First is an evaporator that concentrates fluid milk to 40 percent, or higher, solids. This is handled in the second portion, a new concurrent dryer that requires only 32 ft. of headroom clearance.

This system is recommended for plants that have insufficient volume to warrant investment in conventional large spray dryers. It can also serve as auxiliary equipment in larger plants for special items such as whole milk, chocolate milk, etc.—*Swenson Evaporator Co., Harvey, Ill.*

New Features On '51 Light Trucks

Extra built-in strength and power in a hauling unit for the times ahead have been engineered into the 1951 model light line of GMC trucks.

Engineering changes have added extra horsepower to both the 228 and 248 cu. in. engines on the new line, which ranges from the 100-22 model series in half-ton class on through 2-ton and truck-tractor.

Both front and rear axles on models from 280 on up have been strengthened to take heavier loads while entire

with the new "Unique" Krim-ko COLLOID Agents!

Krim-Ko's newest developments in sea-plant derivatives should be checked by all chemists who are interested in improving and controlling their products. Remarkably good results have been achieved in the application of these improved colloid agents in the food, pharmaceutical, cosmetic and industrial fields. They have proven an effective solution to a wide range of gelling, thickening, suspending and stabilizing problems.

Definite KRIM-KO Advantages

1 **Dependable Uniformity**
Krim-Ko's controlled processes plus Krim-Ko's unique and dependable sources of raw materials make possible a complete assurance of continuous, reliable uniformity. When you utilize Krim-Ko Colloids you know that year after year you will always get an agent of the same characteristics—thus aiding you in maintaining uniformity in your own products.

2 **Custom-made to Fit Your Needs**
The range and variety of Krim-Ko Colloids is so wide—and the manufacturing processes are controlled so accurately—that Krim-Ko can assure you colloid agents that *meet your own particular requirements exactly!* Actually—Krim-Ko Colloids are custom-made to your specifications.

3 **Dependable Source of Supply**
Regardless of world conditions—and possible future restrictions on supplies and imports—KRIM-KO offers you a U. S. source of supply upon which you can always rely.

4 **Tested, Approved and Used by Many Leading Companies**
Many of this country's leading manufacturers and processors are successfully using KRIM-KO Colloids. Krim-Ko's Colloids have met the most severe competitive tests—and won acceptance on the basis of proven advantages.

5 **Laboratory Service Available — Without Cost or Obligation**
Krim-Ko maintains a complete well-staffed laboratory devoted exclusively to the solution of problems in this field. Here continuous research on colloid agents is carried on — assuring you access to the latest developments. If you have a problem involving emulsifying, thickening, suspending or stabilizing—send it on to us. Our laboratory will make their recommendations in confidence—without obligation or cost. Or if you prefer—we will send you working samples for your own laboratory. Write today.

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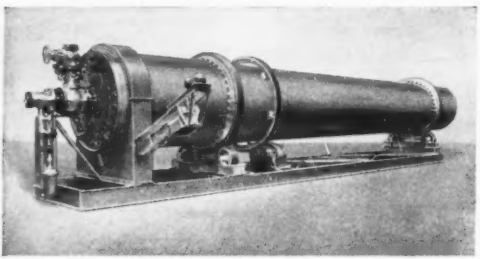
BY GOOD DRYER ENGINEERING



Standard-Hersey dryers bring savings to industry and agriculture because they take full advantage of every possible saving element—men, money, time and material. With Standard-Hersey equipment you get increased hourly output with lower initial operating costs. That is *good dryer engineering*—obtainable only from a dryer organization with years of know-how. The combined experience of Standard and Hersey totals 130 years—your insurance that your equipment dollar will be biggest at Standard-Hersey.

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brake design has been changed to provide more powerful performance and longer wear.

Many of new features on light trucks have been taken from the company's heavy duty line.

Driver comfort has been emphasized with introduction of controlled ventilation windows. Ventipanes in door glass, finger controlled, leave ample room for driver to lean out of cab.

Safer high speed operation has been assured in the 228 engine with piston and ring changes. Pistons are medium duty, lighter weight aluminum with deep wall top rings $\frac{3}{32}$ in. wide, replacing the former $\frac{1}{8}$ in. wide ring.

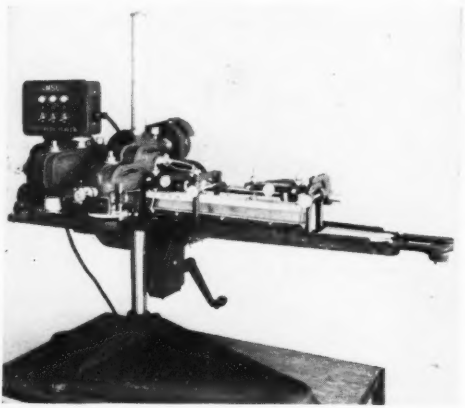
In the 248 engine, the new free-valve has been installed, permitting valve rotation and, accordingly making for longer life. A $1\frac{3}{8}$ in. dia. carburetor has been introduced to increase fuel economy and provide better throttling characteristics.

On the model 100-22, brakes have been changed to the new Duo-Servo type, and front brakes have been widened $\frac{1}{4}$ in. to obtain greater braking force.

On models 280-22, 300-24, S300-24, 350-24, and F350-24, the front brake cylinders have been enlarged from $1\frac{1}{4}$ in. to $1\frac{3}{8}$ in. dia. to compensate for added power built into the rear brakes. These are the same twin-cylinder type used on company's heavier trucks.

Each rear brake has two hydraulic cylinders, making both shoes forward type and thereby increasing braking performance. New hand brake has been installed on rear of transmission, similar to heavy line. This is the dual-shoe type in which shoes engage inside and outside of drum, leaving a large area exposed to help dissipate heat.

Rear brake drums have been changed from centrifuse to cast iron rims and are of heavy section to help heat dissipation.—*GMC Truck & Coach Div., General Motors Corp., Pontiac* 11, *Mich.*

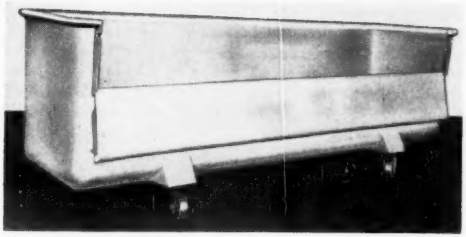


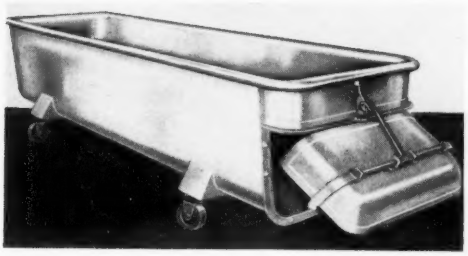
Rotary Bag-Sealer Is Fast, Accurate

Speeds of more than 600 lineal in. per min. can be maintained with a newly developed rotary bag-sealing machine. It can be used for polyethylene, Pliofilm, and other plastic materials which seal by weld.

Unit has special sealing devices that eliminate sticking of the bag material to heat-sealing rollers. A highly sensitive pressure control automatically compensates for materials of varying thicknesses, assuring perfect seals on all bags. A 16-in. closed-top pre-heater conditions the bag materials.

A variable speed control permits easy attainment of



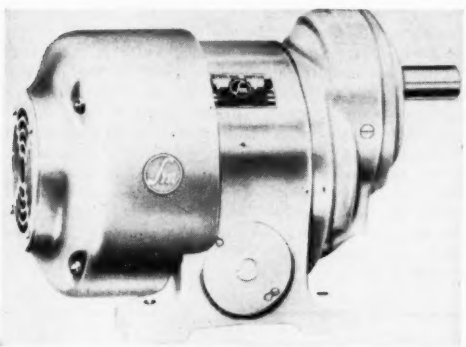


Troughs Stress Sanitation

To meet all health department requirements for sanitation, this dough trough features rounded, germ-free corners with sealed rolled edges. Troughs are available in all standard sizes in either stainless steel, stainless clad, or copper bearing steel.—*Gustav Glaser Co., Inc., 2 Wait St., Paterson 4, N. J.*

optimum speeds. Packages can be supported by the machine's carrier belts, without need of other devices.

Unit is available in vertical floor and bench models, with adjustable sealing head. There are also horizontal models for making bags from cut-to-length extruded tubes. Overall dimensions are 52 in. long, 24 in. wide.—*Amsco Packaging Machinery, Inc., 31-31 48th Ave., Long Island City, N. Y.*

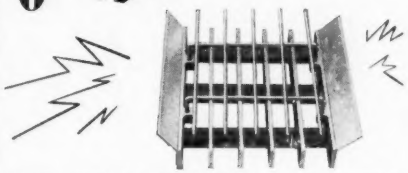


Geared Motor Is Fan Cooled

Newly introduced is geared motor of single reduction, "Klosed-Tite" construction for atmospheres containing non-explosive dusts, vapors and injurious foreign materials. An external fan forces powerful cooling blasts of air over the streamlined case.

Output shaft ratings are the six AGMA speeds starting at 780 rpm. down to and including 280 rpm. This new

6 parallel fields per foot in *Bauer* grate magnet



EACH channel in a Bauer Magnetic Grate is a magnetic field of high intensity. Irresistible pull is exerted upon all ferrous pieces and particles entering the magnetic fields.

Mounted above the Magnetic Grate is a wire grid which baffles the material and deflects it against the magnetized poles. This not only assists in separating the tramp iron, but also screens out sticks, straws, strings, etc.

It is a very simple task to install a Magnetic Grate in a floor opening, hopper bottom, or vertical spout. The grate is simply laid upon a frame so that it can be lifted out occasionally for cleaning.

Magnetic Grates are also used for removing iron objects, filings, and rust from liquids.

We usually build the grates to order in wanted sizes from 2" x 4" up to 6' or 8' square. Ask for Bulletin M-3-A and specific information.

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Actual production figures show that processing costs go down, efficiency goes up with Hamilton Stainless Steel Steam-Jacketed Mix-Cookers. Built to ASME Specifications, Hamilton Stainless Steel mix-cookers are available with single or double action agitators. Stock specifications include maplewood scrapers, but can be furnished with soft metal or plastic scrapers guaranteed not to effect taste or flavor of product.

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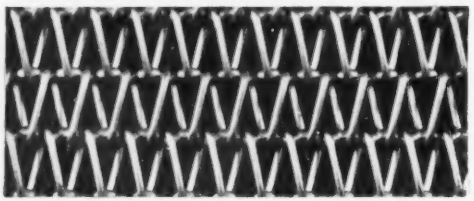

For faster production . . . lower handling costs

For even-flow production in food processing operations involving temperature extremes, you'll find the answer to lower handling costs and dependable efficiency in Wissco Metal Processing Belts.

Engineered for specific job demands, Wissco Belts are fabricated in various weaves of special alloys resistant to heat and corrosive action. Because of their open mesh construction Wissco Belts assure free air circulation and free drainage, make possible easy cleaning. *Write for catalog describing their adaptability and many uses.*

WISSCO METAL PROCESSING BELTS CF&I

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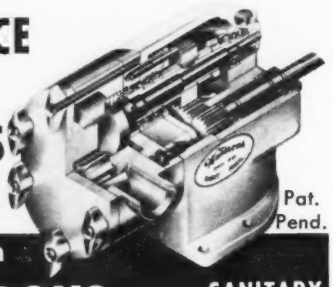

Pat. Pend.

. . . with

WATEROUS 100% SANITARY PUMPS

Replace worn and troublesome pumps before possible material shortages . . . extended deliveries and material substitutions. Wise foresight says buy WATEROUS Pumps now! Take advantage of unique WATEROUS design . . . no contact between rotor and housing assures constant flow . . . long life seals . . easy take down and assembly . . . built-in speed reduction. Available in 316 stainless steel or nickel alloy models.

Write today for prices

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WATEROUS COMPANY
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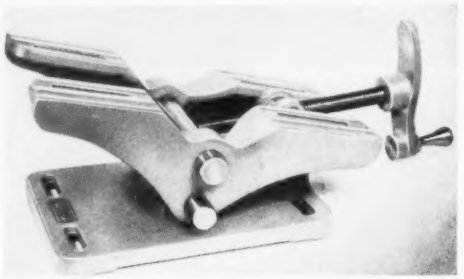
"Slo-Speed" motor, type FWFA, is totally enclosed and includes such features as labyrinth seals, liberal heavy duty ball bearings lubricated for life, patented Herringbone rotor, with motor gears combined in a balanced design from power intake to drive shaft.

Motor can be mounted in any position without modification.—*Sterling Electric Motors, Inc., Los Angeles.*



Tilting Base for FHP. Motors

This new, lightweight, tilting motor base is adjustable in width and length to accommodate all sizes and types of fractional horsepower motors up to 1 hp.

In addition to using it with variable speed pulleys, it also acts as a belt tightener and can be used for easy belt changing on cone step pulleys. Speed changes can be made while machine is in operation. It constantly maintains the correct belt tension and correct alignment. Exact speed control is easily obtained by handle screw adjustment.

New base (patent pending) is only 5½-in. x 7-in. in size. Shipping weight is 10 lb.—*Lovejoy Flexible Coupling Co., 5146 West Lake St., Chicago* 44.

Screen Membrane Speeds Filtration

Faster filtration is reported with a new type of filtering membrane.

Designated as the "Well-Screen" membrane, the new product is normally constructed of 316 ELC stainless steel wire formed to a screen of cylindrical shape. Used within the filter itself, to support the cake which is the actual filtration medium, these cylinders speed up the process. Triangular cross-sectional shape of the individual wire which makes up the screen cylinder eliminates clogging.

Another advantage is in backwashing, the automatic process by which filters are cleaned without manual labor. Screen membranes achieve high efficiency because backwash flow reaches its highest velocity at the exact point of support of the filter cake. Membranes are available in various sizes and can be provided in any alloy which can be drawn into wire.—*Titeflex Inc., 500 Frelinghuysen Ave., Newark 5, N. J.*

Want *More* Information?

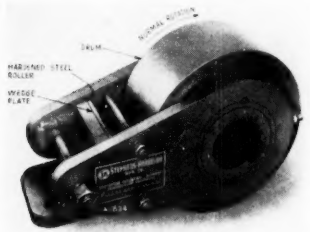
It's free—and easy to get. Simply note here the items on which you want more details, then turn to the Reader Service section inside the back cover, where all are listed by pages and by subjects under, "Editorial: New Equipment, Supplies"—each one with a page key number after it. The key numbers also appear on the handy Reader Service postcard. So you circle those for the items that interest you, sign at the bottom, and mail. No postage is needed.

Separators Are Available In Many Types, Sizes

Complete line of helio-centrifugal separators for removing unwanted liquids and solids from steam, air, or vapors under pressure or vacuum has been announced. Unit has a smooth helix giving steam or air a positive whirling action, throwing unwanted liquids and solids against the separator wall, where they run down to a drip pocket.

Process is stated to take place with no pressure drop. Positive action assures that slugs of water are not carried into the engine or turbine, and that oil or grease will not spoil work in process or gum up pipes.

High tensile cast iron units are available for use with 50, 125, and 250 lb. of steam. Those made of cast carbon steel are for 150, 300, 400 and 600 lb. ASA Standard. Sizes range from $1\frac{1}{2}$ to 24 in. They are designed in both vertical and horizontal style. Steel plate units can be made up special.—*The Swartwout Co.*, 18511 *Euclid Ave., Cleveland* 12.



No Shock or Back-Up With Roller Holdback

Roller-type holdback is designed to prevent reversal of inclined conveyors and bucket elevators when power is interrupted. A hardened steel roller floats between a wedge plate and a drum keyed to head shaft. When head shaft rotation starts to reverse, due to power failure, the steel roller is immediately wedged between the drum and plate, stopping motion without shock. When power is reapplied, the holdback releases.

This type holdback is positive acting. And there is less chance for dust, dirt and corrosion to cause the roller-type to fail.—*Stephens-Adamson Mfg. Co., Aurora, Ill.*

Gas-Type Fire Extinguisher Eliminates Recharging

Gas-charged, water-type fire extinguisher with stainless steel shell is claimed an improvement over the riveted copper soda-acid type. Eliminated is the annual cost and nuisance of recharging, necessary with the latter type. The carbon dioxide pressure cartridge need be replaced only if the extinguisher is discharged.

When the unit is turned upside down and struck on the floor, the gas, contained in the cartridge fitted into the extinguisher cap, is released inside gradually. It directs a steady 40-ft. stream.

Using carbon dioxide as the expellent obviates the need of having acid around the plant.

The steel shell is tested to 500 psi. rather than the customary 350 psi. for riveted units. A plastic transparent nozzle is used. Latter property enables foreign matter to be seen and removed. The unit costs slightly more than the soda-acid type, which it is designed to replace—*Pyrene Mfg. Co., 560 Belmont Ave., Newark 8, N. J.*

Note the neat, uniform stitching of the Dubl-Tape closure. The two strong tapes give double safety, yet the bag is easy to open.

HERE'S the way to close small paper bags economically and efficiently. Union Special's Style 60000 D machine, producing the exclusive Dubl-Tape closure, is designed to speed packaging...cut costs ...and improve appearance.

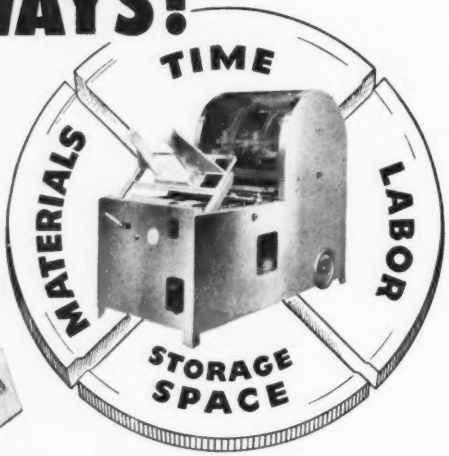
- **FAST**—Speed to match output of standard filling and weighing equipment.
- **NEAT**—Produces an eye-pleasing, sales-stimulating package with high merchandising value.
- **EASY**—Simplified operation . . . anyone can quickly become an efficient operator of machine.
- **ECONOMICAL**—Operating cost per bag is at a minimum . . . uses inexpensive cotton thread and paper tape.
- **VERSATILE**—Adjustable for a wide range of bag sizes, short or long runs.

Send for your COPY!

Write for BULLETIN No. 100 to get the complete facts on this machine... and how it can do a *better* closing job for you.

Union Special
MACHINE COMPANY
450 N. Franklin St. • Chicago 10, Illinois

CUTS CARTON COSTS 4 WAYS!



Today, carton users everywhere are achieving remarkable economies in time, labor, materials and even storage space with the revolutionary Palmer Continuous Motion Carton Former.

This unique machine turns out cartons from *inexpensive die-cut blanks* at speeds of up to 102 per minute. So easy to operate, one attendant can supervise two to three machines. Blanks are fed to the machine in batches of 500 to 1,000 with no interruption to production. It is easily adjustable for various sizes, and can be adapted to many types of cartons.

By virtue of its improved mandrels and forming plates, the Palmer produces better-formed cartons of uniform dimensions. Its *continuous motion* principle of operation—no stop-and-start reciprocating movements—permits longer gluing time, which results in more firmly sealed cartons.

Remember, too, that die-cut blanks require a minimum of storage space, and can be stocked in sufficient quantities so that you need never be caught short of cartons!

Check the savings a Palmer makes and you'll see why this machine *frequently pays for itself in a matter of months!*

For complete information on the Palmer Carton Former, write our nearest office.

PACKAGE MACHINERY COMPANY • CARTON DIVISION
Springfield, Massachusetts

New York Chicago Boston Cleveland Atlanta Dallas Denver Los Angeles San Francisco Seattle Toronto Mexico, D.F.

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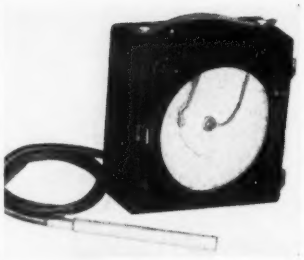
Booth 315, Atlantic City Auditorium, April 17-20

PACKAGE MACHINERY COMPANY



7-Day Temp Recorder For Mobile Units

Continuous temperature records in refrigerated trucks, railway cars, warehouses and ships are provided by the Minicorder, a self-contained thermometer.

It requires no power supply and will run for 7 days without attention. Shock-proof mechanism facilitates installation in mobile units.

Measuring approximately 6 x 6 x 4 in., various models can record temperatures in the range of —30 deg. F. to 165 deg. F. Two-pen models are made for on-off recording of related equipment. Unit weighs 3½ lb.—*Tagliabue Instruments Div., Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.*

Fork Trucks Feature Quick Maintenance

Fast and easy maintenance is reported with a recently announced line of fork trucks. Maker claims a power axle can be removed in 60 min., trailing axle removed in 20 min., and brakes relined in 30 min.

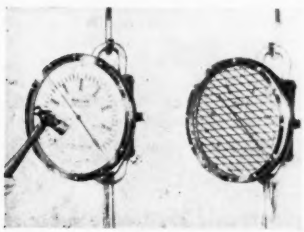
These stand-up-drive Type FC

Makes It Easy

This new wall-type, toilet foot-pedal improves cleanliness because of convenience and ease of operation. It is designed to fit most flush type water units. Device is of sturdy construction, finished in polished chromium plating on heavy gage brass.—*Approved Products Co., 205-B E. 42nd St., New York City 17.*

center-control trucks are rated at 3,000, 4,000, and 6,000 lb. Telescoping lifts are 126 in. and outside turning radius is 74 in. for first two models, 81 in. for largest.

Shockless automotive-type steering wheel is equipped with steering knob for sharp turning and backing into position. Low panel gives operator unobstructed view of the end of the forks when engaging load. One pedal controls power and braking and is operated by the left foot. Controlling levers are located at the operator's right hand.—*The Baker-Raulang Co., 1250 W. 80 St., Cleveland 2.*

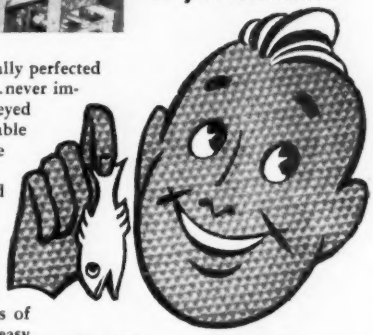


Blow-Resistant Glass Used on Crane Scale

No protective metal guard—as seen at right in photo above—is needed on the new hydraulic crane weigher known as the Hydroscale. For it features a special-tempered impact-resistant dial glass.

SUPRENE BELTING

Helps Food Stay Wholesome



Suprene Belting has been carefully perfected to help foods stay wholesome...never imparts any taste or odor to conveyed products. Made of tough, durable duck and impregnated with the exclusive Victor "Neoprene" compound, Suprene has proved of inestimable value in the packing, processing and manufacture of food products.

Suprene Belting is not only waterproof, but is also highly resistant to the injurious effects of fats, greases and fruit acids. It is easy to wash with steam or hot water. Specify Suprene Belting for all your conveying needs and be sure of safe, sanitary conveyance for years. Send for bulletin 20—it's free.

6456

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Balata & Textile Belting Co.
53 Park Place, New York 7 · 300 W. Hubbard Street, Chicago 10
Factory: Easton, Pa.

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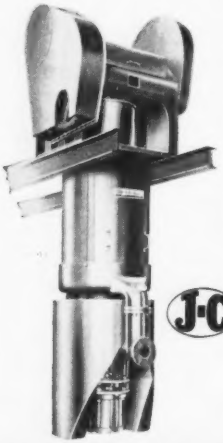
UNITED STATES COLD STORAGE CORP.

UNITED STATES COLD STORAGE

Guardians OF THE NATION'S FOODS

HAVING PRESSING PROBLEMS?

LET US HELP YOU AS WE HAVE HELPED THE FOLLOWING INDUSTRIES:



PAPER PULP: Ultra High Density bleaching-de-inking-concentrated black liquor recovery.

CANNERIES: Juice extractions from pulp.

VISCOSE: Optimum press ratios in continuously pressing alkali from cellulose.

CORN STARCH PLANTS: Dewatering germ and fibre.

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RECLAIM RUBBER: Drier product (15 to 20% moisture). Low cellulose content.

GLUE PLANTS: Maximum grease recovery and drier pulp.

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Are stepping up profits through improved pressing efficiency. For applications to individual problems, for engineering or performance data, write Jackson & Church Company, Department D, at Saginaw, Michigan.

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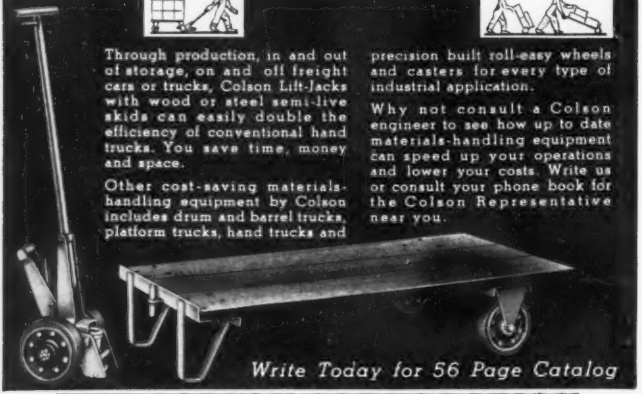
"Work well done since '81"

In Materials-Handling the Colson® LIFT-JACK System

Lets 1 man do the work of 2



Through production, in and out of storage, on and off freight cars or trucks, Colson Lift-Jacks with wood or steel semi-live skids can easily double the efficiency of conventional hand trucks. You save time, money and space.

Other cost-saving materials-handling equipment by Colson includes drum and barrel trucks, platform trucks, hand trucks and precision built roll-easy wheels and casters for every type of industrial application.

Why not consult a Colson engineer to see how up to date materials-handling equipment can speed up your operations and lower your costs. Write us or consult your phone book for the Colson Representative near you.

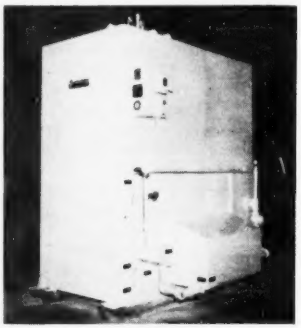
Write Today for 56 Page Catalog

THE COLSON CORPORATION
ELYRIA, OHIO

CASTERS . . . . LIFT-JACK SYSTEMS . . . . INDUSTRIAL TRUCKS

New glass is reported to be up to five times as strong as plate glass of equal thickness, yet will bend as much as 20 deg. without breaking. It is also stated that it will absorb a thermal shock of 500 deg. without breaking, making it practical for use in heat-treat and other areas where there are high temperatures.

Core of the new dial glass is relatively soft, while exterior surfaces are extremely hard. It can be polished and wiped indefinitely without scratching. Maker states this glass is similar to that used in military aircraft searchlights where resistance to heat, rough treatment and scratching are prime factors.—*Hydroway Scale, Inc., 20624 Eight Mile Rd., Detroit 19.*



Bakery Rack Washer Does Job Quickly

Entire spray system of this bakery rack washer is suspended on a double track that travels horizontally, back and forth, 26 times a minute. Racks are washed and rinsed in a few minutes.

Fan-shaped sprays cover the entire surface of the racks uniformly and thoroughly. Unit is stated to greatly reduce washing time, and eliminate unnecessary hand labor. Racks are washed and rinsed in a few minutes.

The machine can be installed at floor level as in a pit.—*Bakery Div., Magnus Chemical Co, Inc., Garwood, N. J.*

Electronic Hygrometer Has Remote Control

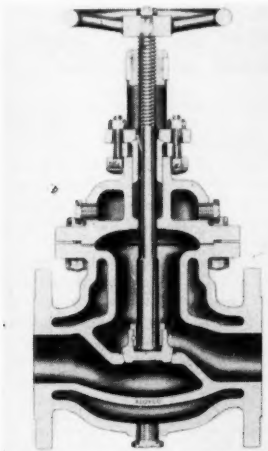
New electronic hygrometer is reported to control humidities down to 1 percent from a central point. The system includes a single-point ElectroniK recorder (circular or strip-chart), with or without control, and a small element that does away with use of human hair. The element employs a golf leaf and chemical salt solution

that eliminates cleaning and other maintenance.

Ability to provide remote reading makes possible centralized control of a complete installation from supervisory panel.

Advantages stated for system are: Provision for direct relative humidity reading without psychromatic charts; use for sensing changes between 20 and 93 percent relative humidity; minimum span of 20 percent humidity throughout range; and availability of all ranges with full temperature compensation between 50 and 120 deg. F.

Instrument is calibrated to ±1 percent accuracy. Responsiveness is reported improved, maker stating that 63 percent of total change is registered in 10 sec. — *Minneapolis-Honeywell Regulator Co., Brown Industrial Div., 4502 Wayne Ave., Philadelphia 44.*



Jacketed Alloy Valves Do Good Heating Job

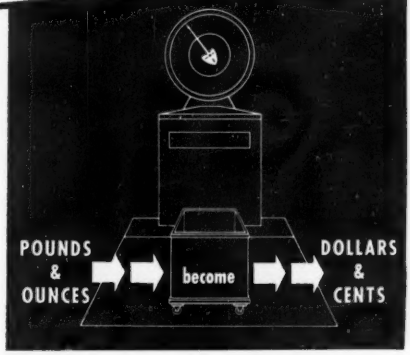
Completely jacketed valves—gate, globe and check types, made of nickel-steel alloy have been announced. They provide efficient heating for handling fluids that solidify or are difficult to move at room temperature.

It is claimed that the advantages of uniform heating with these new valves (cross-section of globe valve is shown) contrast with such heating methods as steam tracing with copper tubing, thermal electric units, and valves with weld-on or with integral cast jackets of insufficient coverage. This is termed the first completely jacketed valve in high alloy.

All three valves use 150 lb. of steam at 500 deg. F. Gate and globe valves are bolted bonnet type, with outside screw and yoke, and rising stem. Former has stationary handwheel, lat-

FOOD becomes Money on your SCALES!

Errors made at the scale stay wrong forever. There is no chance to recheck; either the food product has been shipped or, if incoming, has lost its identity in the general stock. You've got to be right—weigh it *right* — Toledo Printweigh means *accurate* weights *accurately* recorded!



STOP HUMAN ERRORS with PRINTWEIGH

PRINTWEIGH SCALES give you *accurate printed records* of each weighing operation in food industries . . . positive assurance that your weight facts are right *every* time! Prints big, clear figures on tickets or strips. Saves time, stops losses and improves product quality throughout your food plant—for receiving, batching, ingredient weighing, packaging, shipping or other weighing operations. Send for bulletin 2021 on modern weight control.

Ingredient weights recorded by Printweigh.

Accurate printed records provided by Toledo Motor Truck Sales.

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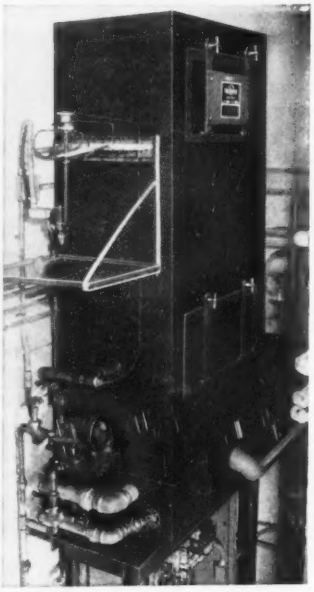
New "Controlled Humidity" Method Gives a Better Solution to Air Conditioning Problems

"Hygrol" Absorbent Liquid Dehumidifies Fresh Air Without Refrigeration

NIAGARA Air Conditioners or Dehumidifiers using "Hygrol" liquid absorbent give precise control of air temperature and humidity... at lower operating cost, with large savings in space and with smaller and less expensive equipment, in many applications.

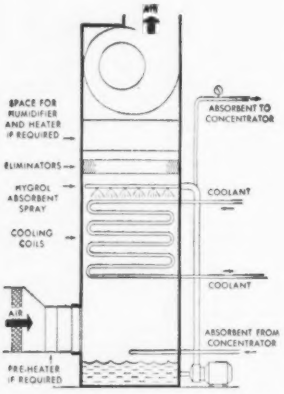
This method dehumidifies the air by passing it through a chamber in which "Hygrol" spray removes its moisture and produces a low dew point. The "Hygrol" solution resulting is continuously and automatically re-concentrated, providing always full capacity in



air conditioning and assuring always a constant dehumidifying capacity and a trustworthy, constant condition for your material, apparatus, process or room to be conditioned.

"Hygrol" is a liquid, not a salt solution; it stays pure and non-corrosive; it does not cause maintenance or operating troubles in food plants or in chemical processes.

Investigate this new Niagara Method for "comfort" air conditioning as well as to protect quality in hygroscopic material, or processes or instruments, or to prevent condensation damage to metals, parts or products.



NIAGARA CONTROLLED HUMIDITY METHOD — FLOW DIAGRAM

Write for Bulletin 112

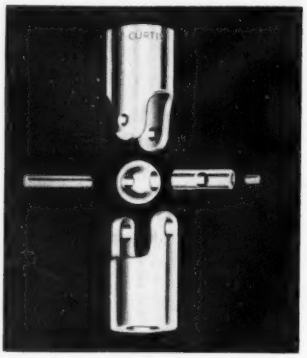
NIAGARA BLOWER COMPANY

Over 35 Years Service in Industrial Air Engineering

Dept. FI, 405 Lexington Ave. **New York 17, N. Y.**

Experienced District Engineers in all Principal Cities

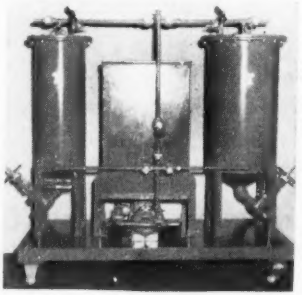
ter rising. Check valves have bolted covers and globe-type checks.—*Alloy Steel Products Co., Inc., Empire State Bldg., New York 1.*



Heat in Universal Joints Claimed to Be Licked

Age-old bugaboo of heat in universal joints is reported eliminated with new Lo Friction unit. Secret is in the friction block. By reducing bearing surfaces and providing for adequate and constant lubrication with a patented oiler, a heat-resistant joint has been produced.

Unit is available in single or double joint form, 1¼ OD, or larger, solid or bored hubs, and round, keyed or splined shafts.—*Curtis Universal Joint Co., Inc., Springfield, Mass.*



Can Obtain Three Areas In Batch Filter Unit

Either 30, 20 or 10 sq. ft. of filtration area may be obtained with the specially-designed general purpose unit pictured above. Thus, best operating efficiency can be maintained whether batch sizes are small or large.

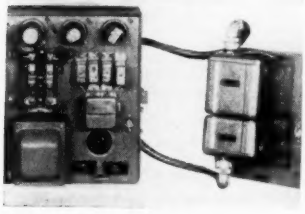
Constructed of 316 stainless steel, unit includes one filter chamber of 10

Handles Acids Safely

This tilter provides a safe, fast, and convenient method of draining acids and other liquids from barrels. A special pouring spout comes with it. Cradle and supporting base are made of structural steel. Locking device permits unit to be held at any angle for pouring so that whole operation can be done by one man.—*General Scientific Equipment Co., 2700 W. Huntington St., Philadelphia 32, Pa.*

sq. ft. area, a second of 20 sq. ft., and a precoat tank. Filter chambers can be operated simultaneously with the precoat tank, or singly as required.

There are permanent filtering elements within the chamber. Unit requires no bags, pads or sheets. Cleaning is stated accomplished in 20 min., without manual labor.—*Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.*



High-Speed Wrapping Register Regulator

A new register regulator for high-speed wrapping machines, designed to permit smaller register marks on generally used wrapping materials, has been announced. It will handle metal foil, waxed paper, cellophane, and cloth.

Using a prefocused optical system,

It's Easier to Sell in

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GET SPOT-STOCK SERVICE FROM:

5 LEHIGH WAREHOUSES **43** TRUCK LEHIGH FLEET **24** HOUR 50-MILE DELIVERIES

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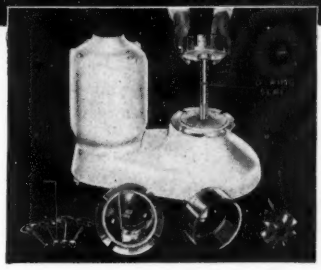

The Sanitary Pump that has featured the simple O-RING Seal for 2 Full Years

Proved in constant production for over 2 years, the "O" ring seal equipped Viking "Sanitor" pump is the dependable, proved, sanitary way of delivering liquid dairy and food products.

Be sure you have the production-proved pump . . . insist on the genuine Viking "Sanitor."

VIKING AN HONORED NAME IN PUMPING

Complete sanitary . . . 3-A approved . . . solid white metal construction . . . full range of sizes and mounting arrangements.

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Slash hours off cleaning time throughout your plant

Here's the 481 Oakite Steam-Detergent Gun—the one-man crew that cleans up your entire plant *in half the usual time.*

No tedious scraping or scouring with this dirt-dynamiter. Just a twist of the valve and the gun fuses heat, force, powerful detergent to get under, lift off all bacteria-breeding deposits—no matter how heavy or how hard-to-reach.

Easy to operate, the Gun requires no motors, injectors, pumps. Just 30 lbs. of steam pressure, a couple of lengths of hose, and a solution container—and you've got the answer to your toughest cleaning problems. The Oakite Steam-Detergent Gun can't be beat for cleaning

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- Blanchers
- Graders
- Elevators
- Conveyors
- Trimming tables
- Peelers
- Sorters
- Fillers
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- Can sealers
- Walls, ceilings, floors

FREE Booklet 7709 tells all about Oakite Steam-Detergent Cleaning—other Oakite shortcuts to plant-wide sanitation. Write Oakite Products, Inc., 26G Thames St., New York 6, N. Y. No obligation, of course.

SPECIALIZED INDUSTRIAL CLEANING

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MATERIALS • METHODS • SERVICE

Technical Service Representatives in Principal Cities of United States and Canada

Tells Moisture of Dried Hops

Great accuracy and speed in testing moisture content of dried hops are claimed for this new electronic instrument. It's aimed at enabling constant checks on hop moisture in storage. Samples do not have to be weighed before testing.—*Tagliabue Instruments Div., Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.*

---

no critical adjustments are required to maintain accurate operation. Unit is reported accurate to 1/16 in. with line voltage variations as great as ±10 percent. Toggle switch control changes from reflected to transmitted light for dark- or light-spot operation. Regulator has terminal blocks for external connection mounted in rear of cabinet. A pre-amplifier in scanner is designed to permit greater separation of scanner and control unit, minimizing effects of stray pick-up and electrical leakage. Standard vacuum tubes are used.—*Westinghouse Electric Corp., Pittsburgh.*

Equipment Briefs

Vinyl Gasket for Refrigerators

Reduced costs in refrigerator operation are reported with use of a new plasticized vinyl gasket designed to provide a better door seal. Gasket, maker states, is stronger, more durable, and has a longer life than rubber unit it replaces. It is stated that the new material will effect savings both in gasket replacement and operating costs.—*Westinghouse Electric Corp., 306 Fourth Ave., Pittsburgh, 30.*

No-Leak Check Valves

Absolute sealing, minimum flow resistance, and leakproof dependability for pneumatic and hydraulic systems are features of line of Circle Seal check valves. Operating principle utilizes a synthetic rubber "O" ring between conical surfaces on the poppet and valve housing. Sizes are from ¼ to 1-in. NPT.—*James-Pond-Clark, Pasadena, Calif.*

Power Mixers Introduced to Food Field

Line of Kelley power mixers is being introduced into the food industry. They are of rolled steel plate welded construction, with adjustable shovel blades designed for close tolerance. Sizes available are 12, 20, 30 and 60 cu. ft.—*Witteman Machinery Co., Farmingdale, N. J.* —End

New Packages and Products

Concentrated Milk Makes Its Debut

Pioneering in a completely new milk product, National Dairy Products Corp., New York, has introduced its Sealtest Concentrated Milk in several test areas. Reports from these locations indicate not only acceptance but in many cases a preference for the concentrate. Seven years research went into the product before it was finally offered to the public.

The concentrate is a pure, fresh, fluid milk which has been concentrated to one-third of its original volume by removing most of the water. It has the same natural protein, mineral and vitamin content as fresh, pasteurized milk.

Keeping Qualities Cited

C. J. Austin, director of Clover Dairy & Supplee Sealtest Laboratory, Wilmington, Del., states, "If properly reconstituted (i.e., with *cold* city water in a container that has been washed with a household soap or detergent) and then stored in an ice box or mechanical refrigerator at about 40 deg. F., Sealtest Concentrated Milk will keep for at least nine days and still have good flavor and low bacteria counts. Under refrigeration at 40 deg. F., tests show the concentrate will keep for four weeks prior to reconstitution".

It is being distributed in ⅓ qt. and 1 qt. containers. When one part of the product is mixed in the home with two parts of water it becomes equal to fresh pasteurized homogenized vitamin D milk. When concentrate is mixed with an equal amount of water it can also be used as an extra rich cereal milk, and it can be used full strength in tea or coffee. Another recommended use is as a flavorful soft drink when mixed with 2 parts of cold ginger ale, root beer, cola, or other carbonated beverage.

Vacuum Packed Prunes With Glamour

Firm, uniform dried prunes are now marketed in a vacuum-packed tin by the California Packing Corp., San Francisco, Calif., under the Del Monte brand. Called "Moist-Pak," the dried prunes are vacuum packed in a 1-lb. tin averaging 34 to 39 selected prunes.

After thorough washing and sterilizing they are partially cooked and sealed under vacuum without syrup. It is emphasized that these are *not* stewed prunes, but moistened-dried prunes that make for palatable eating directly from the can.

Because of their firmness and plumpness they are ideal to stuff for salads and confections. As a breakfast dish, they are easily prepared by covering with water, bringing to boil, and simmering for about 25 min., adding sugar as desired.

"Meal In a Hurry" With Frozen Meats

A new line of seven fresh frosted meats is now being introduced by Armour and Company, Chicago. These items, packed in 8-oz. cartons are: Beef steakees (4 portions), hamburger patties (4 portions), chopped beef (one 8-oz. brick), veal cutlets, pork cutlets, pork tenderloin, and boneless pork chops (3 portions in each).

These items are being marketed to appeal directly to the consumer who wants a product that can be prepared in a hurry and with minimum preparation. Company states that the hamburgers can be prepared in 6 min.; package to plate; pork chops in 7-8 min.; pork tenderloin and cutlets in 30 min.; veal cutlets in 20 to 25 min.; and the steakees in just 3 min.

Replacing the earlier cellophane window carton is a closed package that protects the meats against discoloration and handling.

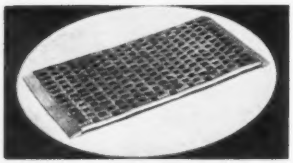
Further protection is given the meats by an inner cellophane liner so that even if the carton is opened to get a full view of the meat, the product is fully protected. Paperboard dividers between meats make it possible to remove them individually.

INSTALL

TUF-TRED MATTING

FOR SAFETY-

QUIET-COMFORT



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A highly popular, low priced, superior grade link rubber fabric matting and the only one equipped with non-trip beveled safety nosing on the ends. The links are strongly laced on galvanized rust-resisting steel wire, reinforced by metal plates. Thickness 5/8". Width: up to 6 feet. Any length.

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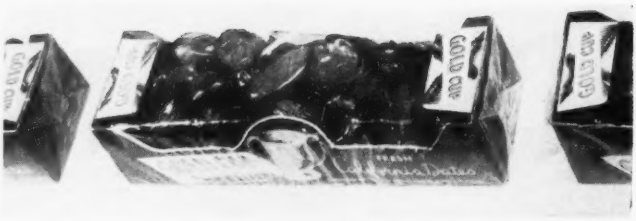


Packaged Dates Gaining In Popularity

Rapidly replacing the bulk method are the prepackaging and vacuum packing of dates.

Parker Brothers, El Monte, Calif., is prepackaging its "Gold Cup" fresh dates in a 1-lb., die-cut paperboard carton, overwrapped with transparent film.

The California Date Growers Assn., Indio, Calif., is prepacking its "Desert Sweets" dates in 1-lb. and ½-lb.-size paperboard trays with transparent film overwrap. The package is in three colors with receipe suggestions printed on the back of the tray, made by Master Cartons, Inc., of San Gabriele, Calif.

Both packers are using a Lumarith acetate film overwrap, made by the Celanese Corp. of America. Gas-permeability of this film permits the dates to "breathe" without need of perforating the wrap.

The Fulton Packing Co., Thermal, Calif., is now vacuum packing its "Blazing Sun" brand dates in 12- and 20-oz. glass jars, sealed with Vapor-Vacuum caps, supplied by the White Cap Co., Chicago.

These packaged dates have met with enthusiastic response by the industry as well as by the shipper, retailer and consumer. Reasons for this acceptability include its protection against contamination, pillferage and deterioration; minimization of shelf-display bruising; convenience in size and shape for pyramiding and mass display; excellent eye-appeal and product visibility; and better storage on the consumer's pantry shelf.

Vacuum-Packed Mints

Mints are now being vacuum-packed in a tin filled with protective gas.

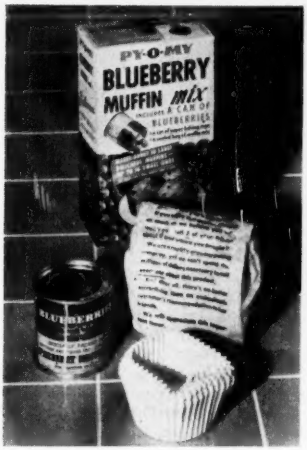
Brown & Haley, Tacoma, Wash., is packaging 12 oz. of its Mayfair brand confection in a tin container lithographed in mint-green, dark green and gold. Inside is a special sheet that says, "Please cover me up and keep me fresh."

In addition to the vacuum tin, Mayfair mints will also be packaged in cellophane bags and waxed cardboard.

Vacuum-Packed Pickles

Packed under vacuum and pasteurized, Fleishman's fresh kosher pickles are being marketed by Fleishman's Pickles, Inc., St. Louis, Mo.

These pickles are packed in 1-qt. glass jars and sealed with an Anchorvac cap. The closure is decorated in red, white and green to match the label on the jar. A white spot on the closure is also provided for price marking. The container and closures are supplied by Anchor Hocking Glass Corp., Lancaster, Ohio.



Blueberry Muffin Mix

Joining the large growing number of prepared baking mixes is Py-O-My Blueberry Muffin Mix, introduced by Kitchen Art Foods, Inc., Chicago.

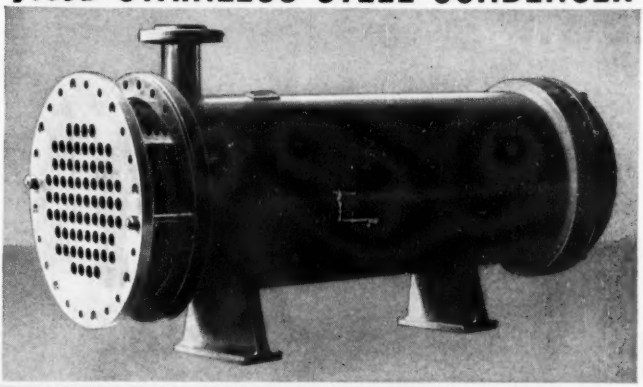
The cardboard carton is in three colors, yellow, blue and red, with the bottom half a background of blueberries. Superimposed is an illustration of the baked muffins.

Inside the carton, there is a heavily waxed glassine bag which contains the mix, consisting of sugar, flour, vegetable shortening, non-fat milk solids, salt, leavenings, artificial flavorings and certified food color. Next, there is a 3½ oz. can of water-packed blueberries and a supply of pleated paper baking cups.

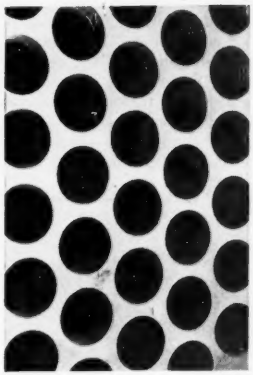
The package contains everything but the one egg and ¼ cup of water called for to make 10 to 16 (depending on the size desired) muffins. Complete directions are given on the carton.

A unique advertising "gimmick" is he message printed on the bag containing the mix. In the form of a letter, it asks the user to "tell three of your friends about it and where you bought it."

This STAINLESS STEEL CONDENSER



CHANGES GAS INTO LIQUID FORM



Note serrated tube holes and quality of the finish.

This condenser was designed and manufactured by the Heat Transfer Division of Downingtown Iron Works, Incorporated.

Shell, tubes and ends are of Stainless Steel. Water is pumped through the shell and around the tubes . . . gas passes through the tubes and is thereby condensed to form a liquid.

Many, many units similar to this are made by Downingtown for domestic and foreign service.

We of Downingtown solicit your inquiry for heavy duty shell and tube equipment fabricated of Aluminum, Inconel, Nickel, Phosphor Bronze, Copper, Silicon Bronze and various grades of Carbon Steel. Some of these are welded by Heliarc. Downingtown is experienced in building equipment with Bimetalic, Finned Tube and Impregnated Graphite.

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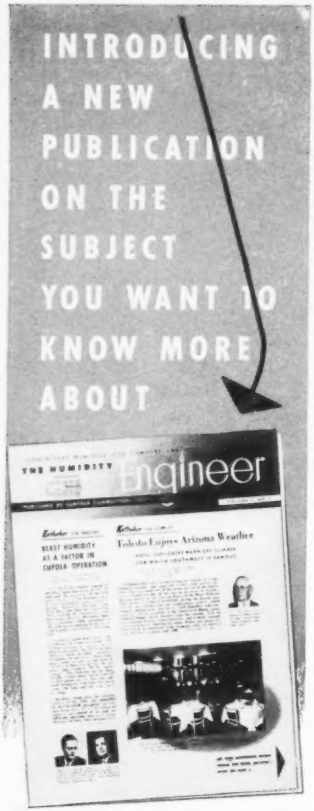

Here is the first issue of a new technical magazine devoted to the science of humidity engineering and its various applications to comfort and industrial manufacturing problems. Published by Surface Combustion Corporation of Toledo, "The Humidity Engineer" contains comprehensive articles on the utilization of humidity control as well as discussions of the new engineering developments employing humidity control equipment in the chemical, food processing and other fields. You can receive this publication gratis by simply filling out and attaching the coupon below to your company letterhead.

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Please send me the "Humidity Engineer".
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Easter Carton for Year-'Round Sales

Together with the "Giant Size Easter Egg Carton", introduced last year (p. 108, Mar. '50 FI.) the Overland Candy Co., Div. of Leaf Brand, Inc., Chicago, is marketing a new Easter package called the "Donald Duck Egg Crate".

Differing from the usual seasonal product, this item is being offered without any design or reference to Easter. Using the famous Disney characters to decorate the egg crate, a holiday appeal is given, yet it is also a year-'round package. This has an advantage for the retailer, who can now order for the holiday season without the usual problem encountered with seasonal merchandise.

Packed in the conventional egg crate-type paperboard carton the package holds 12 chocolate marshmallow eggs.

Nedick's Orange In Cans

With its business built around an orange drink, Nedick's Inc., of New York City, has, for the last 36 yr., operated a chain of refreshment shops extending from Baltimore to Boston.

Last summer, canning lines were installed in the New York City plant to process the drink from 6.3-1 ratio (juice to water) concentrates prepared in California. Both a 5-1 concentrate and a single strength drink are reprocessed and canned, the concentrate in 6 oz. cans and the single strength drink in both 6 oz. and 46 oz. cans. The concentrate, reconstituted, makes 36 oz. of drink.

These products, containing both orange and lemon juices, sugar syrup and vitamin B_1, are now being marketed through retail outlets along the East Coast and as far west as Cleveland.

For Institutional Trade

Seen of considerable interest to the institutional trade is the announcement of the Pacific American Fisheries, Bellingham, Wash., regarding its light meat Keta and red Cohoe salmon:

Formerly packed only in 1-lb. cans, the skinned and boned pack is now available in 4-lb. tins. The trade names, Deming's Sam-O-let and Sirloin brands, are the same as for the well-known 1-lb. tins.

End Labels Up Bread Sales

Different labels on the ends of bread loaves, carrying colorful meal-planning aids, are being offered by Pollock Paper Corp., Columbus, Ohio. One series contains 64 illustrations of food preparations using bread. A second group of 64 contains different recipes for tasty dishes.

This promotional program is designed both for added point-of-purchase appeal and to influence greater use of bread. And sale of other food products on the shelf is also seen helped.

Package & Product Shorts

Diet-Minded? Here Are Three New Items

A new form of canned tuna for those on low fat, low cholesterol diets is the new Chicken of the Sea tuna, introduced by Van Camp Sea Food Co., of California. This product is an excellent source of protein with all the essential amino acids, yet contains less than 1 percent of fat.

A fat free (skimmed) milk has recently been put on the market by Borden's, New York City. It is packaged in the regular quart-size, waxed paper milk container. This milk has only about 1/16 of a teaspoon of butterfat per quart, at the same time containing all the calcium, riboflavin, protein, phosphorous and thiamin of whole milk.

Two low fat content baby foods have been added to Armour and Company's line of baby foods. Strained pork and strained beef hearts are now being packed in 3½ oz. cans at the company's new South St. Paul, Minn., plant. In addition to the low fat feature, both meats contain B complex vitamins in easily digested form.

Mexican Delicacies

A carton of six Mexican delicacies has been introduced by Pace & Co., San Antonio, Tex. Included in the package are Picante sauce, Chiles Jalapenos, Tampico hot sauce, Chiles Serranos and Pepitas. Label was designed by Mrs. Pace. Closures are furnished by Crown Cork & Seal Co. —*End*

Hayssen holds down your wrapping costs

Steady, dependable, automatic wrapping of packages is a job Hayssen Wrapping Machines have been doing successfully for more than 40 years. Low in initial cost, sturdily built, completely automatic, economical to operate, Hayssens keep the unit-cost of wrapping at a low level.

Six-sided, printed designs are accurately registered by the Hayssen Electric Eye. Easy adjustability to wrap many sizes on one machine reduces idle machine hours. Thermostatically controlled electric sealing ensures well-sealed packages that stay trim in appearance. Practically any type of wrapping material can be used. Write for further details and the name of your Hayssen representative.

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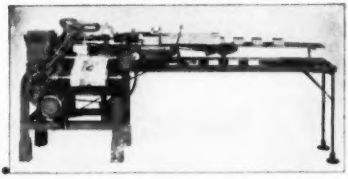

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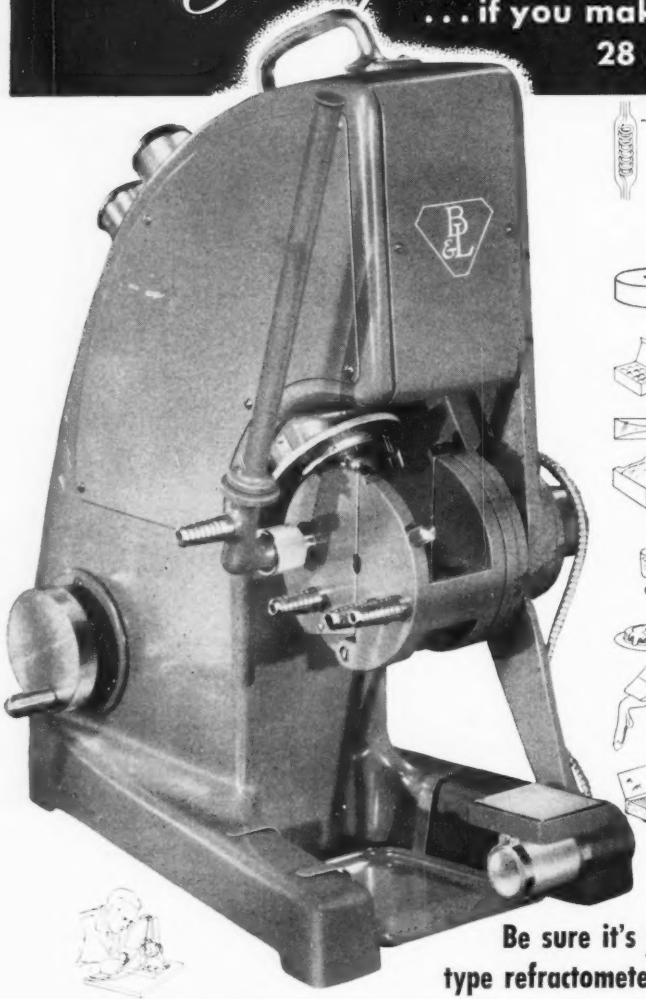

- ACETIC ACID
- ALCOHOL
- BERRY PRESERVES
- BEVERAGES
- BOROSILICATE CROWN GLASS
- BROMONAPHTHALENE
- BUTYRIC ACID
- CHEESE PRODUCTS
- DISTILLED WATER
- EGG SOLIDS
- ETHYLANTRACENE
- EXTRA DENSE FLINT
- FLINT GLASS
- FLUORINATED HYDROCARBONS
- FRUIT BUTTERS
- HONEY
- HYDROGENATED FATS
- IODINE NUMBER (FLAXSEED, SOYBEAN)
- JELLIES, JAMS FRUIT PRESERVES
- MAPLE SYRUP
- NAPHTHALENE
- NYLON
- OIL CONTENT
- PAPER MILLS (STARCH SOLIDS)
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Be sure it's *the world's finest* Abbe-type refractometer—the B&L "Abbe-56"!

Exclusive B&L advantages save time, cut costs, increase operator efficiency and comfort . . . in industrial quality control, in research, and in experimentation. Quick, positive determination of the percentage of dissolved solids in foods. Highest-accuracy identification and testing of transparent and opaque liquids and solids, by either transmitted or reflected light. Here are a few of the "Abbe-56" features you'll appreciate in *your* work.

SPARE PRISM SET—Quickly, easily interchanged; ends "down" time. (Optional)

FIXED-POSITION EYEPIECES—Mounted close together and inclined, for speed and comfort.

INTERNAL GLASS SCALE—Protected from dirt, corrosion. Index, 1.30 to 1.71; theoretical accuracy, ±.0001.

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WRITE for complete information and a demonstration to Bausch & Lomb Optical Company, 603-3 St. Paul St., Rochester 2, N. Y.

Bausch & Lomb "*Abbe-56*" Refractometer

New Technology

New Rapid Method Detects Small Leaks In Cans

Detection of leaks along the side seam, and around closures of cans of food, especially very small or very slow leaks, is an important, but often very difficult job in the study of spoilage. The use of pressure on the inside of the can is often practiced, but is open to the criticism that, in use, leakage is from the outside in, and internal pressure may produce or indicate leaks that would never exist in a normal can with the contents under slight vacuum. Diffusion of hydrogen sulfide gas into cans lined with lead acetate paper has produced useful information on the location of leaks, but it is troublesome to prepare the cans satisfactorily for the test.

By partly filling the cans with water, submerging them in a solution of fluorescein, and then evacuating them, the presence of minute leaks can be established if the water in the can becomes fluorescent. If a gelatin solution is used instead of water, and it is chilled while immersed in the dye solution, the location of the leaks can be found by examining the solidified gelatin with ultra-violet light. A variation of this is to use a sterile medium in the can, and immerse it in a suspension of *Aerobacter aerogenes* bacteria. If the can swells on incubation, leaks were evidently present.

Glass Plates Used

A new and simple way of establishing the presence of leaks and locating them is to cut a circle from both top and bottom of the can without injuring the seams, empty and wash the can thoroughly and dry for 24 hr. at 37 deg. C., or 6 hr. at 55 C. Place the can between two disks of clear safety glass or clear plastic 5 to 8 mm. thick, with soft rubber gaskets 10 mm. thick forming seals between the end seams of the can and the glass plates. One of the gaskets should carry a fine copper tube through its side, by means of which the can can be evacuated. The tube is connected to a source of vacuum through a suction flask filled with water and equipped with a vacuum gage and vacuum release valves.

By partial evacuation of the system and then release of the vacuum the can is filled about three-fourths full with water. A full vacuum is now pulled on the system, including the can now containing water which is visible through the transparent end plates. Any leaks will be immediately visible by the formation of bubbles at their site. By using a liquid of low vapor pressure such as an oil, and using very high vacua of the order of 0.1 mm. Hg, it is possible to locate ultramicroscopic leaks of ½ cu. mm. per hour.

Digest from "A New Method for the Rapid Detection and Location of Microscopic Leaks in Cans", by P. H. Lefebvre, *Revue des Fermentations et des Industries Alimentaires*, 5, 6, 183-88, Dec. 1950.

FRUITS

Prevents Leakage of Juice During Fruit Freezing

Syrup solids made by conventional processes from starch of corn, tapioca, or potato are used in a patented process to minimize bleeding of fruit, or loss of its juice when preserved in the usual quick freeze manner. A layer of such starch conversion solids is applied over the particles of fruit to be frozen, absorbing a large quantity of water before being liquefied and thus promoting relative dryness in the packaged frozen food. These starch-hydrolysis solids contain total reducing sugars, calculated as dextrose, not above 45 percent by weight and preferably between 24 and 45 percent. This product is refined and produced in finely divided form by spray drying. It is ordinarily used in the proportion of 15 to 35 parts per 100 of fruit. Normal pressure is maintained during freezing process.

Digest from U. S. Patent 2,516,891, issued Aug. 1, 1950, on an application dated April 23, 1950, to R. L. Lloyd, Port Washington, N. Y., assigned to American Maize-Products Co.

Producing Orange Juice Free from Oxidation

Protecting fruit juices against contact with air and oxidizing material at all times from beginning of extracting operation until sealed containers are opened, is feature of patented invention for preserving their original flavor. Extraction takes place in a glass chamber under vacuum of at least 27½ in. Hg. Oranges, for example, are fed into chamber through vacuum locks, from last of which fruit falls onto extraction rollers covered with corrugated sleeve of glass or other non-oxidizing material. Rollers turn in opposite directions, and their ridges then cut oranges into strips.

Extracted juice and pulp fall onto a vibrating screen through which juice passes. Pulp is delivered to a screw conveyor which forces the mass into a contracting discharge tube in which waste material is packed sufficiently firm to form a vacuum seal. Juice flows to a vertical pipe, a small intermediate section of which is heated to sterilize juice. As it descends through pipe juice cools and enters a filling and capping compartment, under vacuum, where previously evacuated bottles are filled by suitable valve mechanism. Sterilization in central portion of pipe is accomplished by radiant energy within infrared range, at a temperature of 225 to 230 F.

Digest from U. S. Patent 2,517,569, issued Aug. 8, 1950, on an application dated Nov. 23, 1945, to Erich G. Huzenlaub, Brentford, England.

MEATS

Effect of Heat-Processing On Sausage-Type Meats

Fifteen different types of sausage or table-ready meats and their corresponding raw mixtures have been investigated to determine extent to which nutritive values were affected by processing. No consistent loss of riboflavin or niacin was observed, but losses of thiamin ranged from 2-26 percent. Tabulated results show product, principal meat ingredients,

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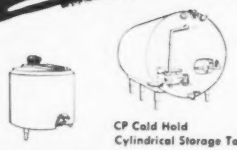
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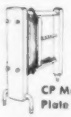
CP Multi-Pass
Plate Heat Exchangers

You'll be wise to look over your production equipment facilities now!

Do you have *enough* equipment of the types shown here to meet your needs? Is it the *right* equipment for high efficiency, low cost production? Can you depend upon it to keep you producing steadily and without interruption?

If you can't answer "Yes" to these questions, simple prudence indicates you'd better see CP *now* . . . and discuss provision for your requirements, whether new or maintenance.

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CREAMERY PACKAGE MFG. CO. OF CANADA, LTD. — TORONTO

nitrate-nitrite cure, smoking treatment, cooking treatment, and drying period. Experimental work is illustrated by detailed steps involved in study of frankfurters, which were of first quality. Poorer grades of franks showed higher losses, due primarily to greater shrinkage and loss of fat and water-soluble nutrients. Bologna, braunschweiger, and franks were stored at refrigerator temperatures for periods ranging from 12 days for franks to 30 days for the other 2 and then reassayed. No significant changes were found in vitamin contents of the stored products.

Digest from "Nutritive Values of Sausage and Other Table-Ready Meats as Affected by Processing," by J. F. Beuk, J. F. Fried and E. E. Rice, *Food Research*, Vol. 15, 302-7, July-August, 1950.

Frankfurter Stuffing Machine

Stuffing and processing frankfurters in lengths up to 8 ft., eliminating usual linking operation, mechanically stripping skin from sausage, and performing these and other operations continuously are salient features of a machine recently patented. Sausage casings are stuffed in conventional manner in equal divisions of original casing lengths which are about 32 ft. long. Thus a 16-ft. section of casing may be hung at its middle portion over an S-hook and completely processed, including drying, smoking, cooking, and chilling. Linking is eliminated and labor of handling reduced. The skin is continuously stripped by machine from long lengths of sausage, in contrast to manual removing of skin from short sections. Finally, sausage is cut into short, straight lengths for packaging, prior to which the square ends are seared.

Digest from U. S. Patent 2,514,660, issued July 11, 1950, on an application dated July 21, 1947, to E. R. McClure and A. L. McClure, San Diego, Calif.

CONFECTIONERY

Confectionery Creams Made Continuously

Any desired type of crystallization in fondant, icing, frosting, fudge, and similar preparations can be produced continuously, according to the claims of a recently patented process. The method combines and performs simultaneously some of the steps of the batch method, and exercises selective control over texture of the product.

In operation, appropriate ingredients are metered to a thermostatically controlled automatic evaporating and concentrating device, where the liquid is quickly brought to the desired stage of concentration. The mixture then flows, at a temperature of 240 F., to a machine in which the beating and creaming operation is immediately begun, conjointly with cooling. Here, again, temperature is controlled by circulating cold water through the jacket of the beater. The material is advanced through the horizontal beater by blades mounted on a rotary shaft provided with selective speed control, and delivered continuously to a conditioning chamber where it is brought to desired temperature and condition for distribution to molds for making preferred confection. Temperature and speed controls throughout process make possible its continuous operation and fine texture of the product.

Digest from U. S. Patent 2,507,477, issued May 9, 1950, on an application dated May 17, 1945, to S. P. MacDonald, Arlington, Mass., and J. I. Thompson, Washington, D. C., and assigned to New England Confectionery Co., Cambridge, Mass.

CEREAL PRODUCTS

Enrichment of Rice Reduces Beriberi

Mortality from beriberi in a test area in Bataan Province, the Philippines, has apparently been reduced by 70 percent as a result of feeding the people rice artificially enriched with thiamine, niacin, and iron pyrophosphate. Test rice contained per lb. 2 mg. thiamine, 15 niacin, and 13 iron.

Beriberi is second only to tuberculosis as a cause of death in the Philippines. In a clinical survey of the test area the incidence of beriberi was found to be 12.76 percent of the population, varying among towns from 5.72 to 24.26 percent. Among the dietary practices of the people, rice was washed several times before cooking, and the wash water was discarded by over 80 percent of the subjects. Test area A, in which enriched rice was fed, had a population of 63,508. Control area B, where the people followed their usual dietary practices, had a population of 29,393. Whereas the incidence of beriberi in area A was reduced by 70 percent, that in area B showed a slight erratic rise of from 6 to 9 percent.

Digest from "Rice Enrichment as a Practical Nutrition Measure in the Philippines," by J. Salcedo, Jr., *The Rice Journal*, April, 1950.

Improved Milling Procedure Gives Full-Nutrient Flour

Crux of a patented process for making flour containing substantially all the vitamins, oils and fats present in the cereal, consists in grinding in such a manner as not to rupture the individual cells of the germ, endosperm, and aleurone. In addition to proper

adjustment of the grinding device, other factors to be observed are the temperature of the cereal berry prior to milling, and the temperature of the flour during milling. For example, wheat berries 90 days out of the field or aged the equivalent thereof are cleaned and polished. They are then tempered to just under 85 F. by spraying with water for a period of 4-8 hr. This temperature is maintained at the first break roll and throughout the milling process, the flour being continuously aerated for that purpose. The resulting product contains the flour cells of the berries in separated but unbroken condition, and with the fats, oils and vitamins within the cells where they will enhance the food value of the flour without tending to make it rancid. The flour thus produced may be stored for long periods without deterioration.

Digest from U. S. Patent 2,509,418, issued May 30, 1950, on an application dated Jan. 14, 1947, to Dan H. Brown, Chicago, Ill.

FATS AND OILS

Alkali Digestion of Livers Ups Vitamin A Yield

Based on vitamin A recovery, alkali digestion of shark and groper livers has been found superior to steam, water, and acid digestion methods for livers with an oil content of 30 percent and up. Such is the conclusion reached in an investigation undertaken to clarify some moot points in the literature.

A standard for estimating the efficiency of the several methods was established by saponifying samples of liver with alcoholic potassium hydroxide, extracting resulting clear solution with ethyl ether, drying extract in vacuo, redissolving in absolute alcohol, and assaying in spectrophotometer. The extinction coefficient was multiplied by a factor to obtain the vitamin A potency, in international units per g.

Digestion experiments consisted in treating 100 g. samples of minced livers with steam, water, and aqueous solutions of caustic soda with and without salt, sodium carbonate, sodium carbonate plus calcium oxide, pepsin and hydrochloric acid, and hydrochloric acid. In addition to laboratory tests, further data were obtained from tests in a fish liver oil factory.

Both tests showed that the yield of oil and vitamin A obtained by steaming and centrifuging is below that obtained by methods in which the liver protein is hydrolyzed. Oils from alkali digestion had a higher vitamin A potency than oils rendered by steam. Of the alkaline agents employed, caustic soda was most effective. Livers whose oil

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All the cooling loads are carried by ten large Frick refrigerating machines.

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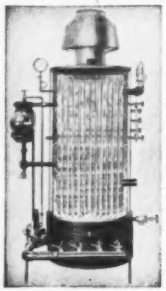
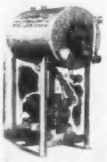


The KANE Boiler, built to A.S.M.E. specifications, in sizes to 30 H.P.

Each KANE BOILER PACKAGE is carefully considered by us as an "individual" job—from the customer's requirements to the finished unit. And each BOILER PACKAGE is a compact, self-contained steam source that includes: the correctly sized KANE Automatic Gas-Fired Boiler complete with gas burner and controls to maintain required steam pressure; and an M-K-O Automatic Boiler Feed system designed to return condensate and supply make-up water as required for highest operating efficiency.



The M-K-O Automatic Boiler Feed returns condensate and supplies small quantities of hot water as needed to the KANE Boiler.

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contained up to 10 percent free fatty acids offer no difficulty in alkali digestion and give a higher oil yield than would be obtained by separate steaming and alkali refining. Reported adverse effect of alkali digestion on the keeping qualities of vitamin A could not be confirmed.

Digest from "A Study of Oil Extraction from Fish Livers," by L. Hartman, *Journal of the American Oil Chemists' Society*, Vol. 27, 409-11, Nov. 1950.

Effect of Salt and Moisture On Rancidity of Fats

Using the filter paper technic for testing antioxidants in aqueous fat systems, the effect of NaCl and moisture on rancidity has been explored in both aqueous lard systems and fat systems containing muscle extract or hemoglobin. It was found that dry NaCl and its solutions at high concentrations behaved as pro-oxidants in fat oxidation. Calcium chloride had a much greater accelerating effect, but KCl had little effect. Dehydration of salt solutions in contact with fat greatly accelerated rancidity. Sodium chloride did not, however, specifically affect activity of solutions containing hemoglobin and muscle extract.

Although differences have been noted in reported effect of NaCl solutions on rancidity, there is little doubt that dry salt in contact with fat always causes acceleration of rancidity. This is particularly true where a complex food containing salt is partly or completely dehydrated. The freezing process, like dehydration, would have effect of concentrating salt and accelerating rancidity.

Digest from "Some Effects of Salt and Moisture on Rancidity in Fats," by I. Chang and B. M. Watts, *Food Research*, Vol. 15, 313-21, July-August, 1950.

DAIRY

Ice Cream Layer Cake By Improved Method

Continuous production of ice cream layer cake in novel containers is described in a recent patent specification. Principal feature of invention is the container, made of paper or other suitable material, into which is inserted a liner formed of corrugated board. Latter has been scored at right angles to corrugations so that when folded it will have a profile similar to the letter U with square corners at the bottom. After liner is inserted in carton, thin biscuits are fitted into corrugations, being held apart by flutings. Thereafter spaces between biscuits may be filled with ice cream.

Carton is closed and sent to hardening room. Entire process lends itself to continuous operation, using a conveyor belt to carry containers through successive steps.

Digest from U. S. Patent 2,517,756, issued Aug. 8, 1950, on an application dated Jan. 25, 1950, to G. A. Zabriskie, III, New York, and Fosdick Zabriskie, Brooklyn, N. Y., assigned to Airline Foods Corp.

New Low-Pressure Homogenizer

Homogenizing pressures having usually been in the neighborhood of 2,000 psi., the chief object of a recently patented machine is to accomplish the same results at pressures of 300-500 lb. Principal feature of the invention is a number of perforated metal screens so disposed relative to each other and to the dises between which they are held, that a tortuous passage is provided for the liquid under treatment. The screens act as an adjustable valve through which the liquid is forced. It is claimed that milk so emulsified has a lower bacteria count, keeps longer, tastes richer, and has a creamier texture than ordinary homogenized milk. The machine is designed for easy cleaning. Screens are stamped out of Monel metal and are comparatively inexpensive to replace.

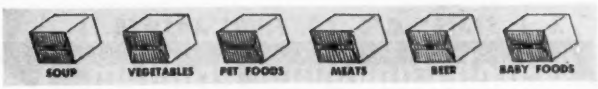
Digest from U. S. Patent 2,504,678, issued Apr. 18, 1950, on an application dated Oct. 13, 1947, to J. H. Gardner, Daytona Beach, Fla., and assigned to Elizabeth Gardner.

SANITATION

Bacterial Count in Vegetables Reflects Plant Conditions

Studies have been made on frozen peas, beans, and corn to see whether a direct relation exists between number of bacteria present and composition and nutritive value of the stored vegetables. Bacterial count was selected as most generally accepted objective test for sanitary conditions in the plant which, in turn, might affect palatability and other factors of quality in frozen foods. Counts were made during various stages of processing and on the frozen vegetables stored at 10, 0 and −10 F. for a period of 2 yr.

Frozen peas collected from commercial plants contained from 1,300 to 870,000 bacterial per g. A critical count seemed to be 50,000 per g. When held at 10 F. for 6-12 months, peas with more than 50,000 upon entering storage rapidly increased in bacterial population. When count was less than 50,000 bacteria decreased during early stages of storage. Little relation was found between bacterial count of original peas and vitamin content after 6 and 12 months storage. Nor did



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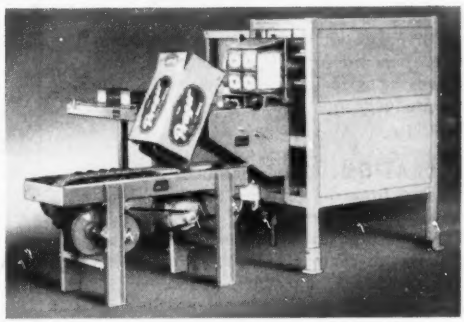


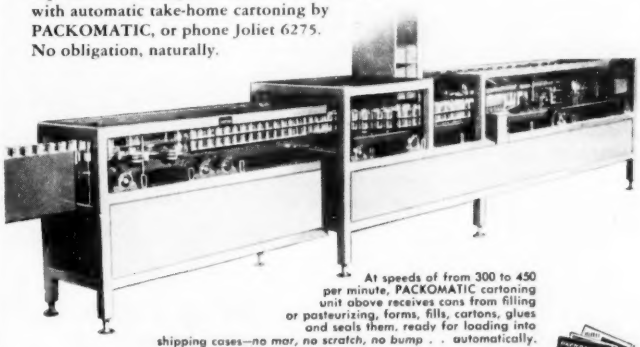
PACKOMATIC's case loader receives completed take-home cartons and automatically packs them into shipping containers placed on loading head by operator. Loaded cases are automatically discharged on take-away conveyor to sealing machine.

Completely automatic carton forming and sealing ... master case loading, gluing, sealing by PACKOMATIC

Take-home cartons—as popularized by the beverage industry—are becoming increasingly important in the marketing of many food products.

Meats, milk, juices, vegetables, baby foods, pet foods and soups—all lend themselves to multiple packaging in take-home cartons—to the increased satisfaction and profit of both retailer and consumer.

If you are considering the many advantages of multiple-unit packaging, write for the fascinating "ATLAS STORY" developed out of practical experience at Chicago's Atlas Brewing Company with automatic take-home cartoning by PACKOMATIC, or phone Joliet 6275. No obligation, naturally.



At speeds of from 300 to 450 per minute, PACKOMATIC cartoning unit above receives cans from filling or pasteurizing, forms, fills, cartons, glues and seals them, ready for loading into shipping cases—no mar, no scratch, no bump . . automatically.

Automatic gluing and sealing the PACKOMATIC way means faster, better, less expensive packaging, plus increased sales and greater profits.

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Starch Conveying Problem

with

SPROUT-WALDRON PNEU-VAC SYSTEM

PROBLEM: To convey starch products from spray chamber to packing area. Capacity required—2000 lbs./hr. Products are hygroscopic, tend to pack and lump when exposed to high humidity air. The conveying system is used for several different products; must be self-cleaning to avoid hold-up.

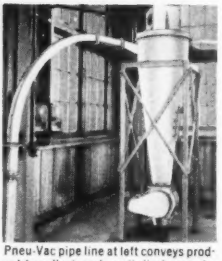
OPERATION: Dried products are discharged from drying chamber through rotary feeder valves to a 4" stainless steel Pneu-Vac pipe line. The Pneu-Vac elevates material to cyclone collector which feeds scalping screen at packing station.

Conveyor air is filtered, dehumidified by cooling, then reheated to obtain necessary low relative humidity. Operational control of the entire system is completely automatic.

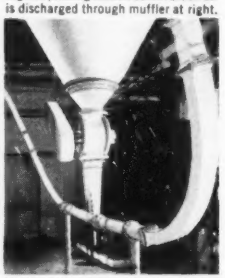
Dust which escapes the cyclone collector returns to the primary drying chamber.

RESULTS: Continuous removal of product from drier chamber is accomplished without danger of foreign matter contamination, or mixing of various products. Stainless steel construction insures product cleanliness. Loss of hygroscopic materials due to packing or sticking to conveyor surfaces is eliminated.

If you have a bulk materials handling problem, talk it over with Sprout-Waldron. PNEU-VAC may prove to be the most efficient solution. Write today to Sprout, Waldron & Co., Inc., 35 Waldron St., Muncy, Pa.



Pneu-Vac pipe line at left conveys product to collector where it discharges by gravity through feeder valve to screening and packing station below. Clean air is discharged through muffler at right.



Bottom of spray drier chamber. Feeder valve discharges starch products to 4" stainless steel Pneu-Vac pipe line.

Product from collector drops to vibrating screen and then to packing bin, from which it is drawn off in drums and multi-wall bags. Pneu-Vac pipe line carrying product from drier to collector is shown in upper left.

LOOK TO SPROUT-WALDRON for BETTER PROCESSING EQUIPMENT

Sprout-Waldron

Manufacturing Engineers

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176

palatability vary in direct relation to bacterial content unless organisms developed off-flavors before freezing.

Frozen bean samples varied in bacterial content from 2,000 to 16,000,000 per g. prior to storage, although beans entering plant have less than 10,000 organisms. The increase in count is picked up in the processing plant. Little correlation was found between bacterial count and vitamin content of stored beans; but off flavors were detected in those cases where excessively large numbers of bacteria had brought about chemical changes prior to freezing. As a bacterial standard, beans entering the freezer should not contain more than 100,000 per g.

Corn samples ranged from 81,000 to 3,500,000 bacteria per g. Average number was much higher in corn than in peas and beans on account of high moisture content of creamed corn being processed. Changes in bacterial count of stored product followed pattern found in peas and beans. Palatability studies, however, showed a more direct relation between bacterial content and development of off flavors in frozen product after 6 months storage. It was concluded that corn should contain less than 60,000 organisms per g. on entering final freezer.

Digest from "Bacteria in Frozen Vegetables," by G. J. Kucker and W. B. Robinson, *Farm Research*, Oct., 1950.

FERMENTATION

Malt Extract Process Employs Centrifuges

Substitution of centrifuges for filters in the conventional process for making malt extract, and recovering a substantial quantity of grain oil as a byproduct, are features of a patented method for production of malt extract. In operation, the cooked mash of corn and malt is screened to remove coarse solids and fed to a centrifuge which discharges a sludge and an effluent containing most of the malt. Sludge is combined with screenings, mixed with fresh water and fed to a second centrifuge. Sludge from this source is sent to drying apparatus, while the effluent is returned to the mash tank to pass through the first centrifuge and join the effluent therefrom. The latter flows to a third centrifuge which yields three products: Malt extract which flows to an evaporator, some additional sludge which is conveyed to drying apparatus, and a mixture of grain oil and water. The last is separated in a fourth centrifuge for recovery of the oil.

Digest from U. S. Patent 2,513,687, issued July 4, 1950, on an application dated Aug. 14, 1947, to G. J. Strezynski, Poughkeepsie, N. Y., assigned to The De Laval Separator Co., New York City. —*End*

Food Industry News

New F&DA Standards for Jam Expected to Cut Dextrose

A new maximum limit on the percentage of sweetener which may be dextrose or corn syrup solids is expected as a result of the hearing held during the first week of January by Food and Drug Administration. The existing standards for fruit jelly, preserves, or butter are likely to be changed in two particulars.

The present standard of identity permits 50 percent of the sweetener to be corn sweetener in preserves or jelly and all of it to be a corn sweetener in fruit butter. In each case a declaration on the label of the presence of the corn sweetener is required. Manufacturers of these fruit products have long wanted to be rid of the declaration, feeling that it tended to imply unwanted appearance of inferiority if there were any statement of the presence of corn sweetener on the label. A considerable group from the industry therefore asked for a change in the standard. Results, to date, appear to be satisfactory all-around.

Proposed to Food and Drug Administration is the omission of any such declaration but a more rigid limitation on the percentage of sugars which can be corn sweetener. In both cases it was proposed at the hearing that not over 25 percent be either dextrose or corn syrup solids or both. Apparently the industry is willing to trade such restrictions for the privilege of eliminating the label declaration.

No significant opposition to this change in the standard of identity was offered at the hearing. Neither the sucrose nor the corn sweetener interests brought up the old battle between the two classes of carbohydrate. Hence it seems likely that before the season for packing 1951 fruit the new provision may be effective.

Defense Needs Estimated For Canned Products

Estimated requirements of canned fruits and vegetables from the 1951 pack to meet the needs of the Armed Forces were announced in January by the Department of Defense.

The estimates, prepared by the Army Quartermaster Corps, are tentative, and are subject to modification. The estimates are announced in order to assist industry in planning production.

Detailed information on individual procurements under this program will be released with the institution of each procurement action. The procurement will be handled by the Chicago Quartermaster Depot, 1819 West Pershing Road, Chicago 9, Illinois, and the Oakland Quartermaster Procurement Agency, Oakland Army Base, Oakland 14, California.

Requirements of canned fruits and vegetables from the 1951 pack are estimated tentatively in pounds as follows:

Fruits—Apples, 39,358,000; Applesauce, 18,575,000; Apricots, 47,628,000; Berries, 10,219,000; Cherries, Sour, 36,645,000; Cherries, Sweet, 8,606,000; Figs, 13,415,000; Fruit Cocktail, 38,864,000; Grapefruit, 30,023,000; Juice, Apple, 3,786,000; Juice, Grape, 4,007,000; Juice, Grapefruit, 26,214,000; Juice, Orange, 41,436,000; Juice, Orange-Grapefruit, 39,025,000; Juice, Pineapple, 35,417,000; Peaches, 74,001,000; Pears, 33,406,000; Pineapple, 51,587,000; Plums, 12,262,000; Prunes, 16,096,000; Puree, Fruit, Asst'd, 323,000; Sauce, Cranberry, 5,717,000.

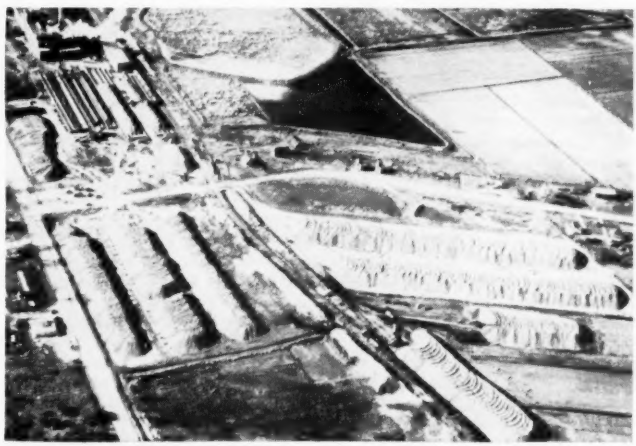
Vegetables — Asparagus, 13,789,000; Beans, Lima, 33,460,000; Beans, String, 65,957,000; Beets, 8,050,000; Carrots, 16,731,000; Catsup, Tomato, 49,498,000; Corn, Sweet, 93,637,000; Juice, Tomato, 52,428,000; Paste, Tomato, 10,536,000; Peas, Green, 101,348,000; Potatoes, Sweet, 20,352,000; Pumpkin, 6,891,000; Puree, Tomato, 7,686,000; Puree, Vegetable, Asst'd, 1,528,000; Spinach, 10,118,000; Tomatoes, 105,875,000.

W. Europe Food Producers Learn U. S. Markets

Western European food and food products producers will get first hand information on the U. S. food market, consumer habits and tastes, and on Food and Drug Act regulations, from George W. Foster, American trade advisor on specialty foods who arrived in Paris recently on a tour of Marshall Plan nations.

The ECA is sponsoring Mr. Foster's trip which will take in 12 ERP countries and take several months to complete. He will advise manufacturers and exporters in each country as to what new food products might find a ready market in the U. S., and what producers have to look out for in order to comply with U. S. Food and Drug regulations. Foster also will suggest ways of boosting sales of European specialty items which now are exported only in small amounts.

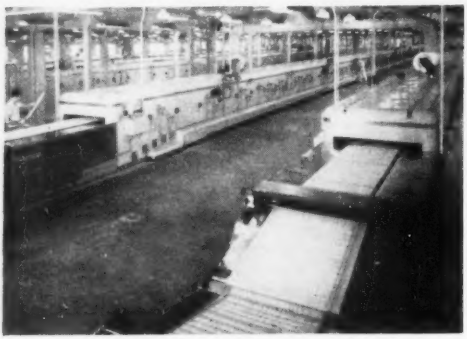
Foster is a private consultant who was formerly vice-president in charge of export sales of the Stokeley-Van Camp Co.



Plenty of Sugar Beets

Stockpiles of 114,000 tons of sugar beets are shown here awaiting processing at the Sebewaing plant of the Michigan Sugar Co. Record crops will keep this plant going well into February, according to early estimates. (Wide World)

NINE-STORY tower, used for storage and mixing operations, dominates new Northwest bakery.



SIX 300 ft. band ovens take up the mezzanine, with time and temperature controls adjustable to various recipes.

HIGH-SPEED packaging equipment completes the production job on 27 varieties of crackers, cakes and cookies.

National Biscuit Builds in Portland

George H. Coppers, president of National Biscuit Co., formally opened the company's new $10,000,000 plant at Portland, Ore., in mid-January.

The 390,000 sq. ft. plant, is Nabisco's most modern bakery, boasting every new feature known to the baking industry. The building is four city blocks long and one block deep at most points. The exterior is faced with tile and the interior has hardwood floors throughout.

Floor space is divided between a tower area for raw material storage and mixing rooms, mezzanine for ovens and cooling conveyors, and the main floor for packaging and shipping departments, and offices.

The nine-story tower is an essential part of the baking operation. Flour, sugar and shortening, main ingredients in Nabisco products, are conveyed through stainless steel pipes to the ninth floor by a suction system, then dropped down by gravity as needed. The two top floors are devoted to steel bins, from which materials are dropped to mixing and proof rooms below, and then on down to the ovens.

The mixing machines blend ingredients for the shaping and baking processes. Each of the six massed band ovens are more than 400 ft. long from the cutting machines to th shipping departments. These synchronized ovens have automatic time and temperature controls adjustable for each product.

Propane gas, shipped from California, provides the fuel. All burners are so made that they can be used with natural gas, when and if it is piped into Portland.

Primary consideration in planning the building was sanitation. Building materials, colors, air conditioning, lighting, and even the basic design, all were aimed at that goal. The ventilating system, especially designed for the Portland plant, changes air throughout the entire bakery every 4 min.

Fluorescent and incandescent lighting units are used in the building.

Production is in three categories—crackers, cakes and cookies—divided into 27 varieties. Raw materials are received from Pacific Northwest sources wherever possible. Flour is received in stainless steel-lined tank cars from the company's Cheney, Wash., mill.

An idea of the supply requirements may be gained from these figures for one month: flour, 3,750,000 lb.; sugar, 448,000 lb.; shortening, 534,000 lb.; salt, 107,160 lb.; chocolate and cocoa, 26,259 lb.; soda, 55,565 lb.; cheese, 21,700 lb.; honey, 81,000 lb.; yeast, 2,008 lb.

The plant produces its own cartons, and in addition manufactures ice cream cones.

At the start of operations 700 persons were employed in the plant. Future plans call for 800 to 1,000.

Products from the Portland bakery will supply the trade in the entire Pacific Northwest and northern California, including the San Francisco bay area.

News continued on p. 181

EAT LOAVES • CANNED MEATS • SPREADS • PORK SAUSAGE

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STANGE CREAM OF SPICE SEASONINGS

Silent Partners in Famous Foods

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• New equipment at Riegel Mills extrudes polyethylene film (without laminating agent) on endless variety of lightweight packaging papers... foil, glassines, greaseproofs, sulphites...as well as on heavy paper and board.

A vast new field of applications for polyethylene has been created by Riegel's extrusion of this new film on nearly all types of lightweight packaging paper. Such combinations provide technical qualities impossible to secure with polyethylene or paper alone. Printing costs are reduced, body and stiffness easily supplied and remarkably tight seals obtained at high operating speeds ...often at lower cost than film alone or present materials. Here are the facts.

How Polyethylene Offers Better Protection. Riegel polyethylene-coated papers have excellent resistance to water, moisture, chemicals and solvents. Even acids and alkalis can be packaged. Moisture vapor transmission resistance and flexibility are extremely good at low temperatures, making ideal packaging papers for the frozen food field. There is excellent resistance to animal and vegetable oils and fats, and good resistance to mineral oils. Polyethylene-coated papers are tasteless, odorless and nontoxic. They will not crack under repeated folding at minus 40° F. They not only maintain their protective qualities at sub-zero temperatures but will hold hot coffee or soup satisfactorily. Blocking resistance is excellent even under tropical conditions. Polyethylene papers have tough scuff resistance and a puncture resistant surface.

In appearance Riegel polyethylene-coated papers have a high gloss and offer excellent sales appeal.

Perfect Packages at High Speed. Riegel polyethylene-coated papers form smoothly at high speed. They can be heat-sealed at 250° F. Strong fast seals can be made coating-to-coating or coating-to-base paper. The extensibility of the coating under stress allows it to retain its form as a film even if the paper fibers are torn apart. Heat sealing is recommended for these papers although some rubber base adhesives have given good results.

Extensive Laboratory Facilities Ready to Check Your Application. Because polyethylene has a few peculiarities, every new application should be checked carefully, whether it be all film or a film and glassine combination. Our Paper Performance Laboratory will thoroughly check each application individually. In many cases a special Riegel paper can be selected to supplement the properties of the polyethylene – in all cases our packaging engineers will be able to choose from over 600 different Riegel papers to give you the best combination for your specific requirements.

We Are Equipped to Coat Your Paper to Order.

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Orange Use

Those Floridians make it very difficult to keep their oranges out of publications what with their concentrating, canning and other forms of use. You may class the above under either "other forms" or concentrating. (Wide World)

Italian Food Exports Continue Decline

Italian exports of fresh fruit and vegetables to Great Britain continued to fall throughout 1950. Figures just released show that during the first eleven months of 1950, Italian exports fell by 50 percent in volume, and 60 percent in value.

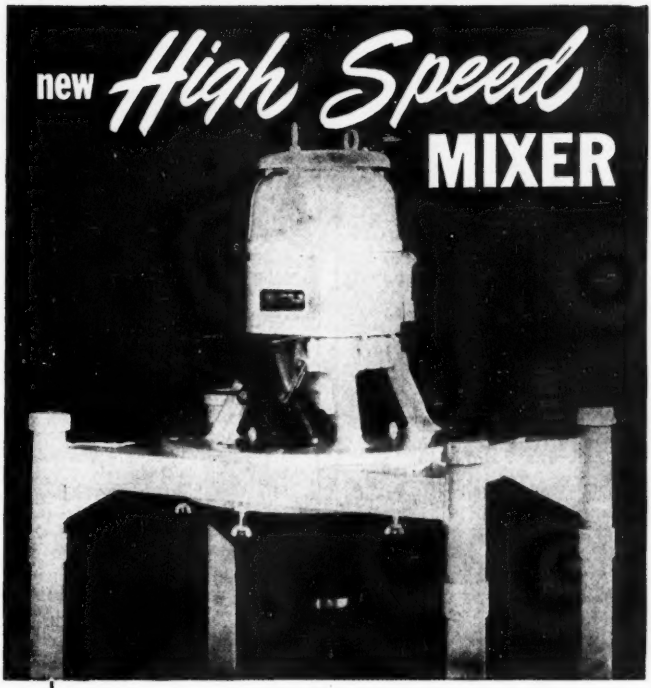
Fruit and vegetables are Italy's main export to Great Britain, and it will be difficult for her to maintain her present satisfactory trade balance (£17,500,000 stg. for 1950) if this trend continues. Italy buys many important materials in the sterling area.

Fortunately, at the moment, this loss of trade in fresh fruits has been compensated by increased sales of canned foodstuffs . . . £2,461,710 in first 11 months of 1949 and £7,251,618 in first 11 months 1950.

Dehydrated Cheese

Cheese in powdered and tablet form is being marketed in the Netherlands, according to "Foreign Crops and Markets," a USDA publication. The cheese is made from Gouda and Edam cheeses under a process that is said to reduce the volume by one half.

At present the cheese is being made in two types, Full Fat, with a fat content of 44.2 percent, and 40-Plus, which has a fat content of 40.9 percent. The Full Fat type has a water content of only 3 percent, a mineral content of 11.9 percent and a protein content of 40.9 percent.



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New, untrained, or day-dreaming personnel can cost you customers and money — by letting uncooked food slip by.

You can guard your quality and reputation with ATI Cook-Chex. These quality control tags attach to retort baskets right through your processing. They tell by an infallible color change when each batch is properly cooked, or which batch, if any, has been overlooked.

Certainty is assured every time, no matter what your cooking time or temperature. Simple to use. Savings in spoilage far outweigh the tiny cost. Send for samples *now*.

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QUALITY CONTROL TAG

USED BY THE WORLD'S LEADING FOOD PROCESSORS

Write for Free supply of samples for trying in your own retorts

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Send samples of ATI Cook-Chex and valuable quality control data.

My Name .....

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FI Changes Name To "FOOD ENGINEERING"

With the April 1951 issue, FOOD INDUSTRIES changes its title to FOOD ENGINEERING. In announcing the change, I wish to point out that the magazine has pioneered in the application of advanced food plant and product engineering since it was launched in 1928.

FOOD ENGINEERING is a more specific and self-defining title for the magazine that serves the engineering needs of food processing plant management. The change in name will be accompanied by an expansion of that part of the editorial content which provides up-to-date know-how for the corporate officials, plant managers, engineers, quality control men, food technologists and others who hold responsibility for the equipping and operating of food plants.

The application of engineering methods was greatly accelerated to meet the heavy processed food demands of World War II. This trend has continued through the postwar years, and now is receiving new impetus from the defense program. This impetus comes from the need to cut costs, to get along with less manpower, and to increase production while not only maintaining, but improving, quality.

The formulation, processing, packaging, and physical distribution of processed food is engineered whether it be in the baking, meat, fruit and vegetable, dairy, cereal, confectionery, beverage, poultry or fish branches of the industry. And the same applies to wines, malt liquors, coffee, tea, spices, sugar, salt, shortening, extracts and, in fact, all processed food products.

Food plants have in common many engineered unit operations and plant services and facilities. Typical are mixing, cooking, refrigerating, materials handling, grinding and separating. Engineered instrumentation is extensively applied to the production lines to insure uniformity of quality and as a necessary part of advanced continuous processes. Food plants must be continuously clean, which calls for engineered sanitation. Finally, the product is filled into an engineered package or container on an engineered packaging line.

The 33 billion dollar food processing industry spent well over $6,000,000,000 in 1950 for plant and equipment improvement. The figure for 1951 will probably be higher. The world's oldest and in many respects biggest industry is, of necessity, becoming one of the most modern.

***Engineering* is the common denominator that links all branches of the food field. The magazine, under its new title, FOOD ENGINEERING, hopes to serve the public by increasing the efficiency of the food industry and thus help maintain or improve the standard of living of the country.**

—Edwin D. Fowle, Publisher

Juicier Orange Balances Slightly Higher Price

As of mid-January 17 orange juice concentrating plants and 40 single strength canners were in operation in Florida, leaving two concentrators and two canners not in operation, and these plants probably will be operating in early February.

Prices being paid for fresh fruit by concentrators and canners have gone above the figure of $1.42½ per box set at the opening of the picking season. At mid-January the cost to the processing companies had reached a range of $1.67½ to $1.72½ per box.

Florida oranges are juicier this year than usual, however, and the increased yield will compensate to some extent for the higher prices. Ralph H. Thompson, head of the processing division of Florida Citrus Mutual, states that last year the concentrators got an average of 1.08 gallons of juice from a box of oranges, but this year so far they have been getting 1.25 gallons. The concentrate companies had used a total of 1,276,000 boxes of oranges up to January 10 of the present season.

Packs of Frozen Foods Held High in 1950

Consumption of frozen vegetables in 1951 is expected to continue at record or near-record high rates for most items, says USDA in releasing some facts on the 1950 pack.

Green peas were again the most important single frozen vegetable. The 1950 pack set a new high of more than 154,000,000 lb., 10 percent greater than the previous record in 1948. In 1949 the frozen pea pack was only 113,000,000 lb.

Several other frozen vegetables made new records last year, but the pack of frozen cut corn was substantially below either the 1948 or 1949 packs. Cold storage holdings of frozen vegetables were at an all time peak at the end of October 1950, when 458,000,000 lb., were in frozen storage.

Bit of Cheese

Kraft processed this tidy item for a Toledo store opening. It's American cheddar and weighs 3,300 lb. It required 33,000 lb. of milk to produce. Customers cleaned it out on the first day. (Wide World)

Italian Experts Study Citrus Processing

American methods in citrus fruit processing are being demonstrated to four Italian experts who are visiting laboratories and plants in Florida, Texas and California.

The 90-day study is sponsored by the Economic Cooperation Administration at the request of the Italian Ministry of Industry and Commerce.

Italy has fallen behind the technical advance in citrus fruit processing methods, particularly in producing citrus oils, largely sent to France as perfume, and other by-products.

IFT Plans Far Advanced For 11th Conference

With plans for the technical sessions taking definite form and working funds already assured by sales of exhibit space, the IFT committee planning the 11th annual conference, in New York, are promising a well rounded program for the five days, June 17 to 21.

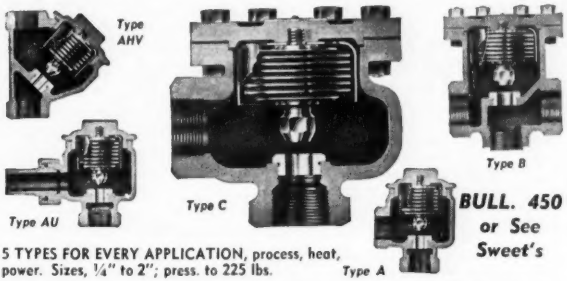
The weeks conferences will get off to a flying start on Sunday evening with a discussion planned on atomic radiation. A general meeting formally opens the meeting Monday morning, while technical sessions are planned for Monday afternoon, Tuesday and Wednesday mornings and afternoons.

Luncheon and dinner on Tuesday will see the presentations of the Babcock Medal, the Food Industries Award and the Nicholas Appert Medal. Monday evening is reserved

Nicholson Steam Traps

CUT HEAT-UP TIME 48%

A large processor recently reduced the heating cycles of cookers from 105 min. to 50–60 min., by substituting Nicholson thermostatic steam traps for a mechanical type. This effected a gratifying production increase of 37%. Reasons for Nicholson's faster heat transfer: operate on lowest temperature differential; 2 to 6 times average drainage capacity; maximum air venting. To learn why an increasing number of leading plants are standardizing on Nicholson thermostatic traps send for our catalog.



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5 TYPES FOR EVERY APPLICATION, process, heat, power. Sizes, ¼" to 2"; press. to 225 lbs.

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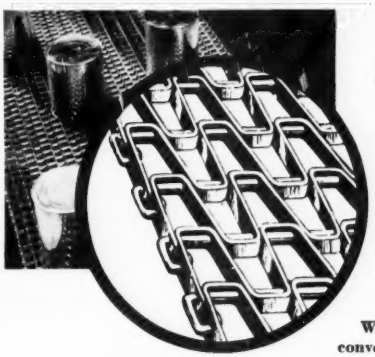
You *Save* on Food Processing Costs with

LA PORTE *Flexible* STEEL CONVEYOR BELTING



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Whether you use this rugged conveyor belting for freezing, canning, dehydrating, on sorting tables, in washers or cookers—or for any other food manufacturing process—it will give you faster, more efficient service from bin to shipper. La Porte Flexible Steel Conveyor Belting retains its shape . . . will not creep, weave nor jump. Easily cleaned with steam or hot water. Requires little care to give extra years of dependable, trouble-free performance.

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for a theatre party, arrangements for which have been virtually completed.

The general committee appointed from the New York section, as host, is headed by Stephen L. Galvin, Huron Milling Co., with John H. Nair, Thos. J. Lipton Co., as co-chairman.

Food Company Earnings Hold Level Trend

Food company sales and earnings continued to run above or close to like periods in the previous year among those reporting in recent weeks.

Continental Baking Co., improved both sales and earnings slightly during the year ending December 30. Sales reached $155,182,652, compared with $154,299,443 for the previous year. Earnings were $5,673,516 against $5,543,196.

General Baking's net sales amounted to $106,775,985 for 52 weeks of 1950, compared with $105,953,757 for 53 weeks covered by the previous annual report. Earnings were $3,172,314 and $3,067,974 for the respective periods.

Armour and Company gained only slightly in sales but its earnings took a decided jump in the company's annual report. Sales were $1,859,827,683, compared with $1,848,280,443 in 1949. Earnings on food operations were at $7,911,349 compared with a loss of $6,225,495 in 1949.

Wilson & Co. sales and earnings were slightly under the previous year with sales reaching $708,777,211, against $709,371,240 in 1949's fiscal year. Earnings were $4,337,038, compared with $4,593,497.

Chase Candy Co., St. Louis, reporting for the last half of 1950 lists sales at $7,186,036, a 15.4 percent increase over the same 1949 months. Earnings, before taxes, for the period were $234,982, compared with a loss of $806,783 in the last half of 1949.

Best Foods, reporting only earnings for the six months ending December 31, showed a net of $2,991,054, compared with $3,173,893 for the last six months of 1949.

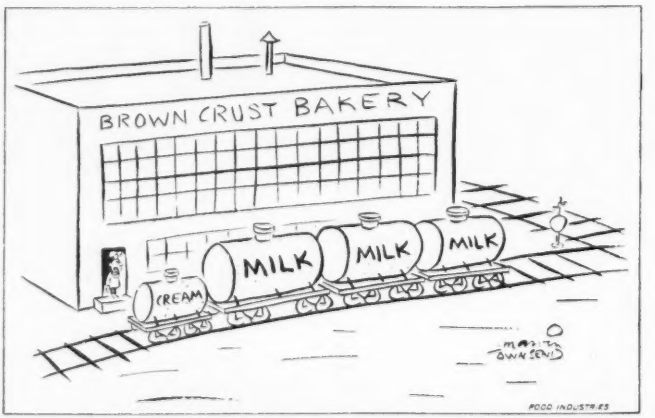
Canada Dry Ginger Ale and American Molasses Co. also reported improved earnings. American Molasses' earnings for the last six months of 1950 totaled $423,307, a big jump over the $117,936 earned in the same 1949 period. Canada Dry showed earnings of $2,217,073 for the three months ending December 31, compared with $1,236,273 in the final 1949 months.

Lloyd Slater Becomes FI Midwest Editor

Lloyd E. Slater has joined the staff of Food Industries as an assistant editor operating in the Midwest out of Chicago. He succeeds E. S. Stateler, who resigned to join the consulting staff of Wahl-Henius Institute. Mr. Slater formerly managed sales to the food industry for Minneapolis-Honeywell Regulator Company's industrial division. A specialist in process instrumentation, he brings to FI over four years of nationwide food plant coverage.

FI's new assistant editor was graduated with a B.S. from Cornell University in 1940, after specializing in Food Chemistry. During college summers he worked in canning plants and on produce growing farms. The war interrupted his career in the food processing field and from 1942 to 1946 he served as a radio officer in the Merchant Marine.

In 1946, Mr. Slater joined Minne-



"OH DEAR! AND I DISTINCTLY TOLD HIM TO LEAVE TWO CREAMS AND ONE REGULAR."

Lloyd E. Slater

apolis-Honeywell as an industry engineer, spending much of his time in the field developing applications for automatic control in food processing. Chief among the projects on which he worked were solution of chocolate handling control problems and a fully automatic coffee roast control system, which has found much use. In addition, he was involved with many of the instrumentation problems posed by the changeover to continuous processing in the canning, dairy and sugar industries.

In 1949, Mr. Slater was appointed Manager of Honeywell's Food Division. In this position he dealt with both the economic and engineering aspects of the industry.

He is a member of Institute of Food Technologists and American Association of Candy Technologists.

Mr. Stateler had been a member of FI's editorial staff since 1930. In 1937 he was assigned to the Midwest area with headquarters in Chicago, where he was responsible for a large portion of the magazine's coverage of food processing developments in the "Nation's breadbasket." He was also prominent in various association activities in Chicago, serving on many committees as well as one term as chairman of the Chicago section of IFT.

Margarine Production Hits All-Time High

Margarine production reached an all-time high of 936,824,000 lb. in 1950, according to figures made public by the Bureau of the Census.

The previous record was reached in 1948 when 908,000,000 lb. were produced.

Per capita consumption of margarine in 1950 was estimated at 6.2 lb., also a new high.

For the first time, colored mar-

New York Packer Steps up Processing of Quick-Frozen Corn

● Installation of a conveyor system using Cyclone Chain Link Conveyor Belt, enabled a New York frozen food packer to increase production volume and cut costs in preparing corn-on-the-cob and corn kernels for quick-freezing.

The Cyclone open-mesh belt permits both steam and cooling wash water to circulate freely . . . speeds up blanching and other operations.

Cyclone Metal Conveyor Belt engineers, drawing on 30 years' experience in the field, will advise you on your conveyor belt problems without obligation. Consult your nearest Cyclone sales office; they're in most principal cities.

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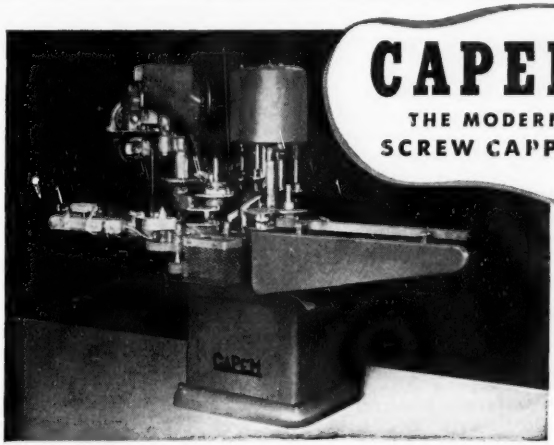

- Applies any type of standard screw cap or cover at speeds of 2,000 to 10,000 per hour.
- Takes container from conveyor line, applies cap perfectly, and returns container to conveyor AUTOMATICALLY without intermediate handling.
- Handles bottles, jars, cans or jugs of any size or shape.
- Delivers a perfect, LEAKPROOF seal at low cost.
- Available in 1, 2, 4, 6 and 8 spindle models.

Write for prices and delivery.

CONSOLIDATED PACKAGING MACHINERY CORP.
BUFFALO 13, N.Y.

BATTERY ELECTRIC TRUCKS helped us *increase production* 55%

(Based on an actual case history)

We make paints and varnishes down at our plant. Business was so good we couldn't keep up with the demand! So, after looking around for a solution, we installed a battery-electric truck-and-pallet system of material handling. Here's what happened:

1. FASTER OPERATIONS—Loading and unloading of rail and highway shipments became easier and speedier. Man hour requirements were lowered substantially.

2. STORAGE SPACE FULLY UTILIZED—By tiering unit loads, we made full use of vertical storage space and consolidated all warehouse operations under one roof.

3. INVENTORY TIME REDUCED 91%—Formerly it took four men three days to take inventory. Now two men can do it in one day.

4. EASIER WORK FOR EMPLOYES—Battery-electric trucks took away the drudgery of material handling. Employes were happier, and many men were released to production lines, thus enabling us to take on additional work from some of our other overloaded plants.

5. SAFER, CLEANER OPERATIONS—Battery-electric industrial trucks are fume-free, virtually fire-proof, clean, quiet and easy to handle.

6. LOW-COST OPERATION—Maintenance costs have been very low. This means dependable operations . . . negligible truck down-time.

RESULT—When we were handling manually, we were hard pressed to ship as much as 800,000 pounds per week. Now with the help of battery-powered fork trucks and pallets, we ship between 1,250,000 and 1,500,000 pounds per week and think nothing of it. Roughly, we've increased production about 55%!

Records like these can be yours, too, with a proper system of material handling. You can find out *how* from our "Handbook of Material Handling with Industrial Trucks." Any company official may obtain a free copy by writing us on company stationery.

THE *Electric* INDUSTRIAL TRUCK ASSOCIATION
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garine production exceeded that of uncolored margarine, due to lifting of federal and state restrictions. In previous years, the white had exceeded yellow production by a ratio of more than five to one.

Finds Milk Regulations Up Consumers Prices

An appraisal of the effects of 17 years of federal and state regulation of milk prices has been completed by Dr. Leland Spencer, professor of marketing at Cornell University. He finds that the milk control programs have raised the cost of milk to consumers as well as the prices paid producers. The increases due to public control, however, are much less than is generally believed, he says.

In his 42-page report, Professor Spencer calls attention to the fact that the state and federal government took responsibility for fixing milk prices at a time when farm incomes were pitifully low. The first objective, therefore, was to raise the farmer's price to a more satisfactory level.

Public control of milk prices has brought greater benefits to farmers in dairy-deficit areas such as Connecticut and New Jersey, than to those in dairy-surplus areas such as milksheds of Chicago, Minneapolis and Des Moines. Due to public control, dairymen in the New York milkshed probably have received about 20 to 25 cents more per 100 pounds of milk sold during the last 17 years, Dr. Spencer says. He estimates the extra cost of milk to consumers has averaged between one-half and one cent a quart.

Norwegian Canners Hit By Tin Shortages

The Norwegian food canning industry is experiencing difficulty in obtaining sufficient tinplate and restrictions on its use have now been introduced.

The Norwegian Ministry of Commerce has stated that requirements of tinplate amount to about 35,000 tons annually, of which 18,000 tons are required for the canned fish section of the industry. Prospects of meeting the industry's requirements during the coming year are small as Norwegian production is not large enough and although tinplate is on the free import list, the possibility of importing tinplate is limited in view of world shortages. It has been particularly difficult to obtain tinplate against dollars.

The restrictions now introduced are intended to ensure that there is sufficient tinplate available for packing the export production of the industry

brisling, sardines, herrings, and other fish—and the restrictions have therefore been imposed on other users of tinplate, such as paint manufacturers and jam packers.

The market for Norwegian canned food is firm and good prices are being obtained. Exports in 1950 are expected to prove about 30 per cent higher than in 1949. Only 270,000 boxes of sprats were tinned in 1950 compared with 496,000 boxes in the previous year and at the middle of December 757,000 boxes of smoked herrings were packed, a little more than in the similar period of the previous year.

Bakery Union Head Fired: His Business Competes

An employee has no protection under the Taft-Hartley Labor Law if you fire him when he becomes head of a union operating a business in competition with yours. Such union activity is not protected by the Law.

That is the finding of a National Labor Relations Board Trial examiner. He recommended dismissal of unfair labor practice charges filed against Guayama Bakers, Puerto Rico.

The law protects "concerted activities" for collective bargaining or for "mutual aid or protection." The examiner held that self-employment of workers is the direct opposite of collective bargaining. He also held that Congress didn't intend, under the mutual aid clause, to give unions an advantage over other business men

Ration Heater

Designated the B-1 oven for troop air carriers, these in-flight food warmers can heat 48 canned rations in about 35 minutes. Two of the ovens are planned for each troop carrier.

NOW PRINT CASES automatically AS YOU PACK THEM

NEW MARKOPRINTER BY Gottscho

At last! A packaging-line machine that gives you "printing press" reproduction of large display designs on corrugated, fibre or wood shipping cases.

Use a MARKOPRINTER to...

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New Gottscho MARKOPRINTER now makes it practical to print your own cases as you use them ... with cost savings that pay for the machine in *less than a year!* The MARKOPRINTER takes loaded cases from sealing or packing station ... separates them for registration ... prints from one to four side panels (and top, too) in single pass ... discharges them to succeeding station—all *automatically*, without operator attention. Exclusive Gottscho "Meter-Matic" inking system and synchronized float-pressure printing assure sharp, uniform print quality at production rates up to 2000 cases per hour. Features 5-minute changeover—from one case size to another ... from one copy legend to another.

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MACHINES to MARK whatever you make

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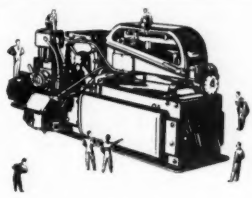
★ *See the MARKOPRINTER in action at Booths 114-116, Packaging Exposition, Atlantic City — Apr. 17-20*

Any Way You Look at It..



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Efficient operation is assured by such features as tightly sealed shafts to protect bearings from dust, all ball bearing construction, a feed register to calculate the total amount fed, and drive gears that operate in an oil bath. Moreover, this feeder is available in a variety of sizes that can handle from ounces to 3000 pounds per minute.

Here are some of its other outstanding characteristics:

Can be manually controlled or synchronized with other equipment for automatic operation.

Constant speed belt weighing all the material that is fed coupled with heavy duty construction help insure years of dependably maintained accuracy.

Compact design requires little floor space. Meets class 2 group G specifications.

Sturdy, dust-tight, corrosion resistant construction.

Removable side panels and gear box cover, and a hinged scale beam cover permit ready access to all parts for easy maintenance.

To find out more on how feeding BY WEIGHT, the Merchen Way, can eliminate your feeding problems, just contact your nearest W&T Representative.

M-10

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CHLORINE AND CHEMICAL CONTROL EQUIPMENT
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The 250-ton-per-day Soybean Extraction Plant of The Glidden Company, located at Indianapolis. The products produced here are degummed and non-degummed soybean oil and 4-Hi Meal.

The Glidden Company has assumed a leading role in the nation's food, paint and chemical industries and today operates 37 plants and two mines in 25 communities. Visualizing the soybean as a vastly important source of raw materials for food, feed, paint and chemicals, Glidden established soybean research and processing plants at Chicago and Indianapolis.

Important in soybean processing is the elimination of the dust problem. For this purpose Glidden chose **DAY** Dust Control systems with highly efficient **DAY** Type "AC" Dust Filters.

6 FILTERS, 4 COMPLETE SYSTEMS INSTALLED IN INDIANAPOLIS PLANT

System one includes one **DAY** Type "AC" Dust Filter installed on the pulverizer grinding system used for grinding toasted flakes into meal.

System two combines two **DAY** Type "AC" Dust Filters operated in parallel for dust control on the bean preparation operations, including de-hulling and the collecting of dust off the flakes before they are transmitted to extraction.

System three consists of the extraction filters. Two **DAY** Type "AC" Dust Filters are connected in parallel and recover dust from the hull cyclone and the meal cooler cyclone.

System four utilizes one large **DAY** Type "AC" Dust Filter which is divided into two sections and located on the track shed roof. Section one collects dust from the bulk meal car loading system; section two collects dust from the grain unloading operations at the elevator.

DAY CAN SOLVE YOUR DUST PROBLEM

Since 1881, The **DAY** Company has specialized in engineering, manufacturing and installing dust control systems. **DAY** engineers are ready to serve you efficiently and economically regardless of the dust situation in your plant.

For complete information about **DAY** Dust Control Systems and the **DAY** Type "AC" Dust Filter, Write-to-**DAY**.

DAY SINCE 1881

The **DAY** *Company*

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IN CANADA: P. O. Box 70D, Ft. William, Ont.
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when unions became employers or business enterprises and entered into competition with other businessmen.

The bakery company fired its master baker when he refused to give up his new job as president of an AFL bakery workers local. As president he directs two bakeries the union operates in competition with Guayama Bakers.

New Foundation To Study Uses for Marshmallows

New uses for marshmallows as a food and as a confection will be studied by the newly established Marshmallow Research Foundation, according to Paul L. Allman, vice-president of the Cracker Jack Co., and acting chairman of the Foundation.

Supported by the nation's top marshmallow manufacturers, the Foundation will direct an intensive research and public educational program designed to expand and promote the use of marshmallows commercially and in the home. In addition, the Foundation will concern itself with new merchandising technics, which will be made available to retailers to boost their marshmallow sales and profits.

Mr. Allman heads a committee that will supervise the Foundation's activities. Other members include W. B. Riley, Brock Candy Co.; J. E. Long and Paul Flum, Shotwell Manufacturing Co.; Charles Supplee, Frantz Candies, Inc.; and K. E. Madden and Nathan Cohen of Candyland, Inc.

Specify 20-Mesh Screen For Cannery Wastes

Industries on Puget Sound, in Western Washington, have reached an agreement with the Washington State Pollution Control Commission on disposal of their industrial wastes by piping a considerable distance into the Sound. This method is intended to prevail until treatment may be found possible.

For vegetable and fruit canneries, minimum requirements specify a 20-mesh screen for removal of suspended material from the processing wastes.

Chile Joins in Program To Develop Durum

A Pan-American program to develop Durum wheat which will resist stem rust and other plant diseases has been launched by the National Macaroni Institute in cooperation with the Chilean government.

As a first step in the international search for better Durum, the Macaroni Institute recently presented Ambas-

Settles Argument

You could have worked up an argument a few years ago as to the wisdom of trying to grow celery on northern Minnesota muckland. That was before Jeno Paulucci, of Duluth set out to furnish his Oriental foods plant with some of the items it needs. This stalk, they tell us, is typical of a truckload recently delivered to Paulucci's plant.

sador Felix Nieto Del Rio of Chile with samples of the best wheat seed from the Durum growing areas of North Dakota.

Ambassador Del Rio announced the seed would be turned over to the Chilean Department of Agriculture and the Sociedad Nacional de Agricultura, Chilean farm group, for experimentation and testing in the Durum areas of Chile. Durum seed from the South American republic will be similarly tested in North Dakota.

Sockeye Salmon Pack Well Under 1946

Despite the failure of the sockeye-salmon run and the early closing of the season, canneries along Puget Sound in Washington state packed 110,442 cases, compared to 93,471 cases in 1949, the Fish & Wildlife Service reports. This is far below the nearly 270,000 cases packed in 1946, the last sockeye cycle year.

Since escapement was better than had been expected, spawning may have been adequate for a normal run in 1954, the Service said.

Total Puget Sound salmon pack reached nearly 400,000 cases, including 250,000 standard cases packed from American-caught fish and 150,000 cases packed from imported salmon, largely from British Columbia, Alaska and the Columbia River. In 1949, the canneries packed more than 900,000 cases.

Biggest drop was in pinks, from

LYNCH CORPORATION of Toledo, Ohio,

—a leading manufacturer of packaging machinery

—says

"This Lubricant Reduces Service Calls!"

MORPAC Model "T" and "K" combined print forming, wrapping and cartoning machine

The following quotation is taken from a letter we received from their Director of Sales:

"The majority of our machines are used in places where it is necessary to wash them with steam and hot water after each day's use. This naturally would remove any ordinary lubricant and trouble would develop if the machines were not immediately relubricated. With LUBRIPLATE it is different. There is always a film of LUBRIPLATE left on the machine after washing. This gives protection not only to moving parts, but also prevents general corrosion. The presence of salt and lactic acid in packing plants makes oxidation a hazard. LUBRIPLATE prevents this too.

"LUBRIPLATE greatly reduces unnecessary wear and prolongs the life of machines. It has reduced customer calls for service to a minimum. Our Service Engineers can readily spot machines that have had other than LUBRIPLATE Lubrication, as these machines do not give the service they should.

"After using LUBRIPLATE for over ten years, we are very well pleased with it and enthusiastically recommend it."

A LUBRICANT must be more than good to warrant such a recommendation. The Lynch Corporation, as well as hundreds of others who build machines to sell, not only use LUBRIPLATE Lubricants in their own shops, but also advise the buyers of the machines to always use LUBRIPLATE for re-lubrication.

LUBRIPLATE Lubricants are different from all other lubricants. They have properties all their own . . . they reduce friction and wear, prevent rust and corrosion and save power. They stay put under most adverse conditions and do not run out or wash away.

There is a LUBRIPLATE Lubricant that is just the right density for your requirements. Let us tell you about it. *Write today.*

LUBRIPLATE DIVISION
Fiske Brothers Refining Company
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DEALERS EVERYWHERE—CONSULT YOUR CLASSIFIED TELEPHONE BOOK

LUBRIPLATE ***THE MODERN LUBRICANT***

for blending or proportioning foods

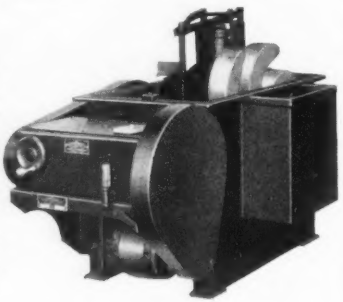
WHEN THIS WHEEL SPINS!

In the processing of fruit and vegetable juices, sauces and chunks, OMEGA ROTODIP METER is a "winner" for feeding liquids of all kinds: solutions, suspensions, and emulsions. With its rotary dipper wheel — the heart of the Rotodip — this meter delivers at the precise flow rate required by the continuous processing or blending operation. Feeding rate is instantly adjustable, either manually or at the command of automatic pacing devices such as Builders Chronoflo Telemeter or Builders Pneumatic Scale (Conveyoflo).

Due to the unique design of the dipper wheel, normal fluctuations in the level of liquid within the meter do *not* affect its accurate performance. Rotodip Meters are fabricated of materials to suit job requirements: steel, cast iron, all stainless-steel, Monel, etc. For complete information and Bulletins, address Omega Machine Company (Division of Builders Iron Foundry), Harris Ave., Providence 1, R. I.

Omega manufactures a complete line of volumetric and gravimetric feeders for dry materials and for gravity feeding of liquids and solutions:

Belt Gravimetric Feeders • Loss-In-Weight Gravimetric Feeders • Universal Feeders • Precision Solution Feeders • Disc Feeders • Rotodip Solution Feeders • Rotolock Feeders • Dust Collectors • Bucket Elevators



BIF INDUSTRIES **OMEGA** OMEGA

THE LAST WORD IN FEEDERS

550,000 to 1,003 cases, 1950 being the off-year for pink salmon. Balance of the pack was made up of 74,405 cases of chums, 55,036 of silver and 6,737 of chinock salmon.

Enamel Can Developed As Tin Substitute

American Can Co. recently conducted a formal demonstration of their work in developing an enameled steel can, in which the only tin used was 3 percent in the thin strip of solder that seals the side seam of the can. Suitable for dry food products such as baking powder, ground coffee and shortening, Canco's new container provides an organic coating of domestic manufacture, as a substitute for tin, in protecting the steel base and the contents packed in the can.

Most cans in general use, Dr. B. S. Clark, American Can's director of research pointed out, are made of light steel plate to which has been applied a thin coating of tin.

The development is one of the results of the company's continuing research program called "Operation Survival" which is aimed at producing containers made entirely from materials available on the American continent.

Bakery Worker's Wages Climb 4.3 Percent

Union wage rates for bakery workers increased an average of six cents an hour—4.3 percent—in the year ending last June. Average base rate last July was $1.37.

Increases ranged from five to ten cents for three-quarters of the 75,000 workers covered in the twelfth annual, 74-city Bureau of Labor Statistics survey of average wages paid to union bakery workers.

Largest increase—seven cents—went to workers in machine bread and cake shops. Among hand shops, Hebrew nationality bakeries were highest with an average increase of six cents. The base rate in these shops was $1.93—the highest average in the industry. The lowest average rate was found in cracker and cooky plants—$1.11.

Overtime pay is not included, so the rates do not show total hourly earnings.

Libby Buys Polar

Acquisition by Libby, McNeill & Libby of Polar Frosted Foods plants at Mount Vernon and Grandview, Wash., has become an actuality after having been rumored for many months. Libby operated the Mount Vernon

Want It A La Mode?

This gen-u-ine vanilla chiffon pie was prepared for a bakers' meeting in Cincinnati. It measured 42 in. in diameter, weighed 110 lb. Representatives of U. S. Army baking school, attended the meeting and discussed the project with the pie's bakers. (Wide World)

plant last year under lease while the Cedergreen Frozen Pack Corp. operated the Grandview unit.

Price for the two plants is reported at $900,000. Polar had operated the Mount Vernon plant for many years and had just completed construction of the Grandview unit when it went into bankruptcy after the war. Assets were purchased by Cedergreen, which in turn was purchased by Pacific American Fisheries of Bellingham, Wash.

Cornell Again Offering 1-Year Dairy Course

The New York State College of Agriculture at Cornell University will again offer a one-year course in dairy manufacturing and marketing. The course for 1951-52 will begin the third week in September. Enrollment in the course is limited so early application is desirable.

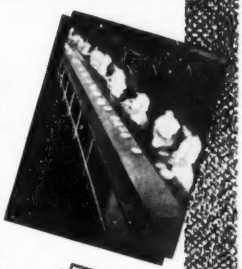
The program consists of the following courses: Elementary Dairy Industry, Dairy Plant Equipment, Agricultural Bacteriology, Milk Production, Processing of Milk and Milk Products, Milk Marketing and Business Management, Dairy Mathematics, Oral and Written Expression, and Physical Training.

Applicants for the one-year course must have graduated from high school and must present the 15 units of entrance credit required by the University. Previous experience in the dairy industry is necessary.

Enrollment is open to non-residents as well as residents of New York State.

Where Can This
MOVING TABLE TOP OF STAINLESS STEEL
...increase YOUR processing efficiency?

Sandvik's Stainless Steel Belt Conveying Work Tables Are Minimizing Costs In Operations Such as Chicken Eviscerating • Bacon Slicing • Frankfurter Packing and Weighing • Hamburger Preparation • Tenderizing • Cake-icing • Cup-cake Icing and Packing • Ham-boning • Pork Rolling Fish Fileting • Vegetable Preparation Potato Chip Distribution, etc.



Here's a way to modernize food handling operations. Sandvik's standard work table units carry your product on a flat, endless band of stainless or carbon steel. Units can be adapted to virtually any application.

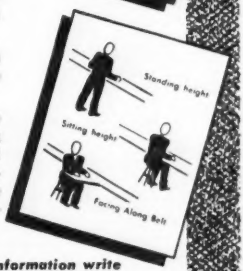
ADVANTAGES

EASY TO KEEP CLEAN—Live steam or boiling water can be applied directly.

NO TASTE CONTAMINATION—A smooth, impermeable surface . . . No place for food particles to lodge.

LONG SERVICE LIFE—Sandvik steel belt has inherent high strength and resistance to time and wear.

ENGINEERED TO FIT APPLICATION—Lengths to meet any center distance. Standard work table widths are 20" and 12" but special widths are also available. Correct working height can be arranged despite special floor conditions. Special, custom-built units also available. SS-59



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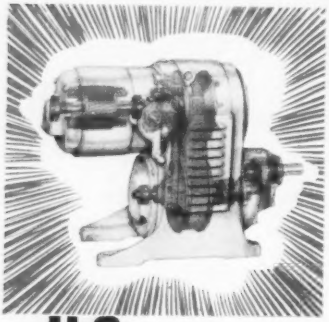
Manufacturers Of Steel-Belt Conveyors
For Over 30 Years

Miracle MOTOR

STEPS UP MACHINE OUTPUT



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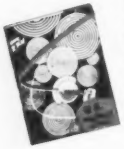
INCREASES PRODUCTION 10%—20%—30% OR MORE

Varidrive will give your powered equipment any and every speed needed right up or down to a split rpm. No external gearing. Simply turn the control handle for instant speed selection. Speed can be regulated to compensate for variation in operator's ability—or to obtain correct rhythm of movement. Varidrive speeds compensate for changes in viscosity, temperature, line-flow or size of work handled. You get maximum output and better quality.



2 TO 10,000 RPM

"As slow as a snail or fast as a flash," or any in-between speed, enables you to get miracle performance out of your machines with Varidrive. Select speed ranges up to 10:1 variation. Sizes... ¼ to 50 hp.

GET BULLETIN

Interesting Bulletin full of facts proving big savings you can make with Varidrive.

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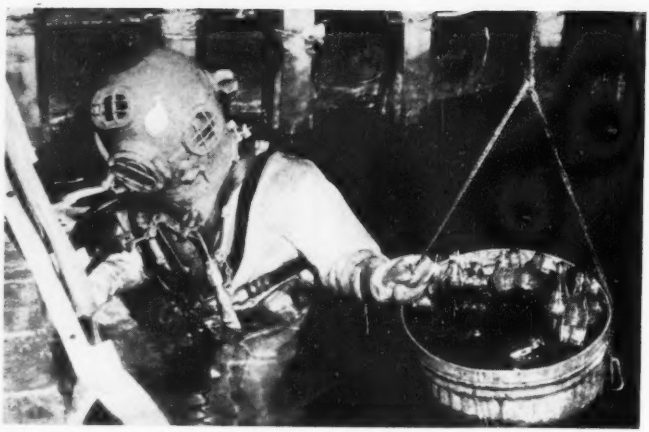

Bottle Salvage

Navy diver goes down alongside pier of Quonset Point, R. I., Naval Air Station to haul up soda bottles, tossed overboard by ship crews during past nine years. They have already salvaged over 5,000 bottles and estimate 50 times that number are left. Sold back to bottlers, proceeds go to Navy fund. (Wide World)

Inquiries concerning application should be directed to Professor Leigh H. Harden, Roberts Hall, Ithaca, New York, who is in charge of admissions for the College of Agriculture.

Expand Home Gardening

Expansion of home gardening and home food preservation activities has been resumed by the Department of Agriculture. The action followed recommendations of an advisory group which met in Washington recently at Secretary Brannan's invitation.

In approving the expanded program, Secretary Brannan announced that the Cooperative Extension Service, Federal and State, would have responsibility for leadership in the program. Both garden and food preservation work is already being carried on in all states and territories. The national program, however, is expected to give added impetus to these existing activities.

Meat Inspection

Under the "so-called Farm Products Inspection Act", the Secretary of Agriculture proposed extending inspection and certification service to all meat packing plants, whether or not in interstate commerce, to the extent that such meat packing plants request such service. First notice of this proposal was published last year on page 2757 of the May 9 Federal Register, and applied only to those plants not operating under Federal inspection. A second and modified notice appeared on page 8861 of the December 14 Federal Register, broadening the offer to any meat packing plant. Written comments were received until January 15, 1951.

As of early February, the final decision had not been announced. No opposition had been offered, however, by any of those plants whose products would be brought into Federally "inspected and certified" category by this new regulation.

F&DA Food Standards

Status of food standards of Food and Drug Administration in early February is reviewed below:

Future Hearings

1. *Evaporated milk*, amendments, standard of identity. March 5, 1951. Proposal would amend present standard so that Vitamin D content be not less than 25 U. S. P. units per fluid ounce of the finished evaporated milk, as determined by the A.O.A.C. official method. Mr. Bernard D. Levinson was designated presiding officer. This announcement appeared on page 731 of the January 26 Federal Register.

2. *Margarine*, amendments. Hearing tentatively scheduled for about March 27, announcement expected soon. Amendment would accept name "Margarine", permit use of additives for flavor stability, raise Vitamin A minimum content, and specify method of Vitamin A analysis.

Hearings in Progress

Ice cream, new, standard of identity.

This hearing began as scheduled on January 8 and continued until January 22. At this point a recess was taken and February 14 was set for the resumption of the hearing. Major revisions in the tentative schedule issued at the beginning of the hearing were made as a result of the first two weeks of the proceedings. Presiding officer Edward E. Turkel sent a letter dated January 24 to all those who have indicated to FDA their interest in the ice cream standards hearing, outlining the revised tentative schedule through May.

Tentative Orders Awaited

1. *Canned mushrooms*, amendment, standards of identity and fill. Expected soon; hearing adjourned in June 1950, briefs filed in July.

2. *Residue tolerances*, on fresh fruits and vegetables; new. Not expected soon.

3. *Fruit preserves, jellies, and butters*, amendments, standards of identity. Not expected soon; briefs could be filed until February 19, 1951. (See separate news item.)

Final Orders Awaited

1. *Canned corn*, amendment, standards of identity, quality, and fill. Expected soon; tentative order published in April 1950, exceptions filed in May.

2. *Cream cheese with (and) other foods: Neufchatel cheese spread with (and) other foods*, new, standards of identity. Expected soon.

3. *Bread*, new, standard of identity. Expected soon; effort being made to issue final order as soon as possible.

4. *Frozen fruits*, new, standards of identity and fill. Not expected soon. Exceptions were filed until January 11, by further extension authorized by Federal Security Administrator.

Standards Completed

None since last reported. (Food Industries, October 1950, page 147.)

USDA Grade Standards

Recent actions by Production and Marketing Administration of U. S. Department of Agriculture on U. S. Grade Standards and related activities include the following:

Edible sugarcane molasses, new, proposed, page 6474, September 26 Federal Register (corrections, page 6598, September 30 Federal Register), time for written comments further extended to March 24.

Sugarcane syrup, new proposed, page 6467, September 26 Federal Register, time for written comments further extended to March 24.

Rough rice, brown rice, and milled

Increase consumer demand . . .
Raise flavor levels . . . with

Huron MSG
MONOSODIUM GLUTAMATE 99+%
and
Huron HVP
HYDROLYZED VEGETABLE PROTEINS

For that perfection in food flavor which assures enthusiastic consumer acceptance and continuing demand . . . many food processors have already found Huron MSG and Huron HVP valuable aids in raising flavor levels.

Huron's specialized service is always available to suggest ways of obtaining maximum taste value consistent with economy through use of Huron MSG and HVP. To those who have not used our service, we suggest a simple way in which you can prove the advantage of using Huron MSG and HVP. For example, in

MEAT PRODUCTS:

To corned beef hash and hamburgers add 2 to 3 ounces MSG per 100 lbs. of product. In stews and meat and vegetable mixtures use MSG from 1 to 4 ounces per 100 lbs. For those meat and vegetable mixtures with strong, braised meat flavors, Huron HVP products are more suitable. While these are prepared as liquids, pastes, and powders, the liquid HVP is more convenient for use in the products above at levels ranging from ½ lb. to 2 lbs. per 100 lbs. of product.

In pork sausage, wieners, bologna, loaves and similar meats, use MSG at levels from 1 to 4 ounces per 100 lbs. of product.

Call on us in confidence for assistance. Samples will be sent immediately with specific recommendations.

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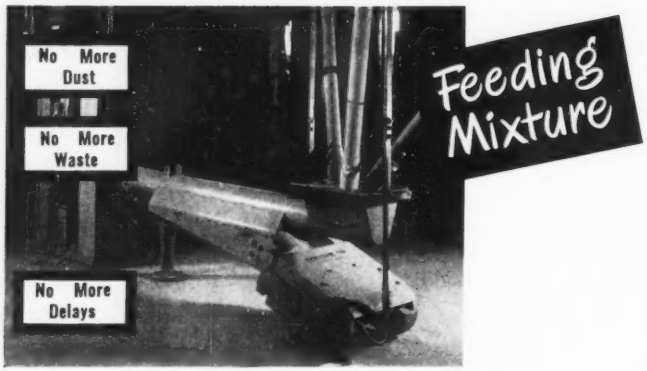

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VIBRATORY FEEDERS

FLAT PAN FEEDERS

Will also handle most types of bulk materials — abrasive, fine, lumpy—hot or cold—dry or damp—at variably controlled rates from pounds to hundreds of tons per hour—to mixers, belts, crushers, screens, blenders, driers, packaging machines, etc.

Due to absence of motors, gears, cams, pulleys, eccentrics, sprockets, and other wearing parts, Syntron Feeders operate with an exceptionally low maintenance cost.

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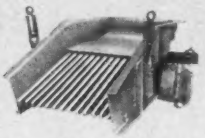

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WRITE FOR CATALOG DATA

Experienced Syntron Material Handling Engineers are ready to work with you in applying the proper model Feeders to your problems.

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rice, revised, proposed, page 772, January 27 Federal Register, written comments received until March 20. (Informal public hearings were scheduled to be held on March 1 in Crowley, La., and on March 8 in San Francisco.)

Veal and calf carcasses and vealers and slaughter calves, revised, proposed, page 861, January 30 Federal Register, written comments received until March 1.

Cream for use in manufacture of butter, new proposed, page 860, January 30 Federal Register, written comments received until April 15. Purpose of the proposed standards is "to (1) provide more adequate standards for grading cream in the voluntary continuous inspection service which the Department already has made available to the dairy industry, (2) develop in cooperation with State agencies and industry groups, the most useful uniform set of cream grades possible for voluntary industry-wide use in cream quality improvement programs and in plant procurement of cream, and (3) stimulate more discussion of cream quality factors and encourage more voluntary action to improve quality."

Dry milk scorched particles, new, page 923, February 1 Federal Register, effective March 3.

Schedule of Events

March

5– 8—American Society of Bakery Engineers, 27th annual meeting, Edgewater Beach Hotel, Chicago.

12–14—Northwestern Canners' Assn., 37th annual convention, Davenport Hotel, Spokane, Wash.

12–17—State College of Washington, 20th annual institute of dairying, Pullman, Wash.

April

2– 5—American Society of Mechanical Engineers, spring meeting, Biltmore Hotel, Atlanta, Ga.

9–11—National Fisheries Institute, 6th annual convention, Hotel Statler, Boston.

16–18—National Independent Meat Packers Assn., annual meeting, Palmer House, Chicago.

16–18—American Dry Milk Institute, annual meeting, Edgewater Beach Hotel, Chicago.

17–20—American Management Assn., 20th annual packaging exposition, Auditorium, Atlantic City, N. J.

30–May 4—American Material Handling Society and Material Handling Institute, conference and 4th annual exposition, International Amphitheatre, Chicago.

May

1– 3—American Oil Chemists Society, spring meeting, Roosevelt Hotel, New Orleans.

14–16—Millers National Federation, annual meeting, Edgewater Beach Hotel, Chicago.

21–25—American Assn. of Cereal Chemists, annual meeting, Minneapolis. —*End*

Changes in Food Supplies

Stocks

CANNED FRUITS AND VEGETABLES in canners' hands Jan. 1, compared with the same date a year ago were reported by the National Canners Assn. as follows:

	(000 omitted) Actual Cases 1949	1950
Peas	12,133	12,625
Sweet Corn	24,442	14,302
Green & Wax Beans	8,605	10,847
Tomatoes	9,479	5,151
Tomato Catsup	8,850	5,982
Chili Sauce	1,513	840
Tomato Juice	14,602	11,168
Asparagus	726	1,057
Red Pitted Cherries	1,069	1,302
	Basis 24/2½s	
Apricots	1,655	1,173
Sweet Cherries	742	440
Peaches	11,598	5,553
Pears	2,890	3,453
	Dozens	
Baby Food	55,341	62,138

Production

The following packs were recently reported by National Canners Assn.: GREEN BEANS canned in 1950 amounted to 16,890,325 actual cases, compared with 16,883,238 packed in 1949. Wax beans totaled 1,935,537 actual cases in 1950, compared with 2,419,617 the previous year.

TOMATOES canned in 1950 totaled 18,724,350 actual cases, only slightly under the 1949 pack of 18,873,672.

TOMATO CATSUP packed in 1950 reached a total of 14,792,598 actual cases, a substantial increase over the 10,900,407 cases packed in 1949.

CHILI SAUCE packed in 1950 came to 1,814,481 actual cases compared with 1,369,575 cases in 1949.

ICE CREAM production during December was estimated at 28,945,000 gal., 1 percent under December, 1949 and 7 percent less than the 1944-48 average for the month. November-December decline was 18 percent, compared with a 13 percent drop a year ago, and a five-year average between these months of 14 percent. Production for the year is estimated at 539,775,000 gal., compared with 556,654,000 gal. in 1949 and a five-year average of 568,237,000 gal.

SHERBET production showed higher production in every 1950 month when compared with the corresponding month the year before, though both periods were far under the five-year average. Total 1950 production came to 15,970,000 gal., compared with 13,573,000 gal. in 1949. Average annual output for 1944-48 was 29,866,000 gal.

MARGARINE produced in December totaled 89,959,000 lb., of which 64,433,000 lb. were colored. Output in December, 1949 was 76,949,000 lb., of which only 24,501,000 lb. were colored.

LIQUID EGG production dropped to 2,393,000 lb., in December, compared with 39,934,000 lb. produced in December, 1949, and a five-year average of 8,178,000 lb. Dried egg output was 549,000 lb., compared with 8,737,000 lb., in December, 1949. Frozen eggs dropped to 1,406,000 lb., compared with 9,308,000 lb., in December, 1949.

CHICKS hatched during December made up the largest total on record for the month, reaching 65,847,000, about 19 percent above December, 1949 and 65 percent above the five-year average.

POULTRY canned or used in canning during December came to 14,008,000 lb., about 25 percent above the amount so used in December, 1949 and 37 percent above the five-year average for the month. The quantity canned in 1950 reached 152,049,000 lb.

Storage

FROZEN FISH AND SHELLFISH held in storage on January 1 totaled 157,007,105 lb., compared with 146,812,532 lb. on the same date a year ago.

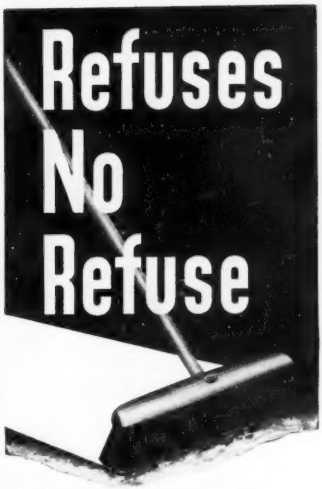
PUBLIC FREEZER occupancy went up 2 points during December, to equal the December 31 average of 81 percent. On the same 1949 date occupancy stood at 76 percent.

PUBLIC COOLER occupancy declined 4 points during the month to stand at 67 percent on December 31. Average decrease during December, however, is 5 points.

Indexes

Business Week's index of business activity dipped to 233.1 for the week ending Feb. 10, down from the previous week's 235.6 and the 233.6 of a month ago. A year ago it was 191.4.

The Commodity Index on Foods compiled by the *New York Journal of Commerce* hiked to 205.2 for the week ending Feb. 16, which compares with 204.6 for the previous week, 193.4 for January, and 171.6 for March, 1950.



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Men, Jobs, Companies

GEORGE SHAMLIAN

Peter Paul, Inc., elected George Shamlian to the newly created post of chairman of the board, at a recent board meeting, and named John H. Tatigian to succeed him as company president. Mr. Tatigian had been vice-president and general manager of the company's Naugatuck plant.

JOHN H. TATIGIAN

A. L. BRUCKNER

Directors of Swift & Co. have announced the appointment of A. L. Bruckner as vice-president and treasurer. He succeeds William B. Traynor, who retired February 1. Mr. Traynor will continue as a member of the board of directors. Mr. Bruckner had been assistant treasurer since 1945.

WILLIAM B. TRAYNOR

Industry

Armour and Company has agreed to pay $250,000 to the Greenbrier Co., Cleveland, O., in lump-sum settlement of patent claims for use of poultry picking machines of types widely employed in the industry.

The settlement ends litigation started in federal court in Chicago, June 14, 1948, against Armour. Suits against other poultry processors are pending.

Borden's has closed its National Milk Sugar Co., at Bainbridge, N. Y., and shifted production to a plant at Boscobel, Wis. The plant made sugar of milk, a lactose used for infant feeding, pharmaceuticals and in production of penicillin.

General Foods Corp. is contemplating moving a major part of its general offices out of New York City within the next few years, though some executive offices will continue to be maintained in the company's Park Ave. Postum Building. The company has options on properties in White Plains, N. Y., which are being seriously considered in the new project.

General Mills, Minneapolis, will build a plant to produce amines, amides and nitriles from animal and vegetable oils. Located at the company's Chemoil Plant in Kankakee, Ill., the new unit is scheduled to begin pilot operation in the fall of 1951.

The Green Giant Co. (formerly Minnesota Valley Canning Co.) has now arranged to place with The Mutual Life Insurance Co., New York, $6,500,000 of 3⅜ percent notes due in 1971. Proceeds of loan will be used to refund $3,580,000 of notes held by The Mutual Life and to provide additional funds for expansion of Green Giant's business.

Hines-Park Foods, Inc., Ithaca, N. Y., has licensed 28 food manufacturers and 57 ice cream manufacturers to market 150 products under the Duncan-Hines label during the first nine months of its franchise operation. A wide variety of these food products are now coming to the market in volume.

C. J. Patterson Co., Kansas City, Mo., has approved an increase in its authorized capitalization to 100,000 shares of 5 percent preferred of $10 par value and 500,000 shares of $1 par value common stocks to provide for merger of six associated baking companies. These companies are: Ark Bakers, Inc., Kansas City; Ark Bakers, Inc., Wichita, Kans.; Delta Bread Co., Greenville, Miss.; Holsum Bread Co., Chattanooga, Tenn.; Ark Bakers, Inc., Hot Springs, Ga.; and Sally Ann Bread Co., Grand Junction, Colo.

PictSweet Foods is readying plans for the addition of canned Blue Lake Green Beans to the company's line, according to E. J. Watson, Vice President and General Manager of PictSweet Foods, Inc., Mt. Vernon, Washington. Watson stated that acreage has been obtained and a new production line is being installed in the company's Albany, Ore. plant.

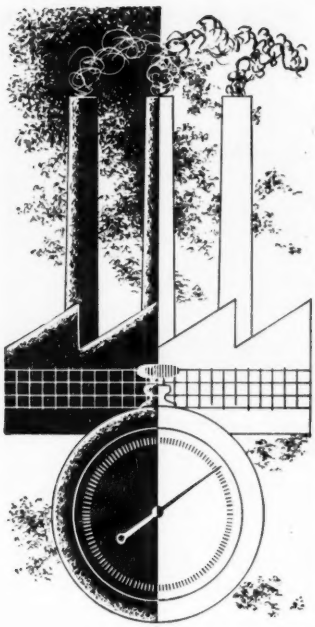
Peshastin Fruit Growers' Association of Peshastin, Wash., has awarded a $141,200 contract for construction of a cold storage plant. Second unit of the association's building program, the plant will be of reinforced concrete construction, 126x101 ft, adjacent to the structure built in 1947. It will have 4-in corkboard insulation on the walls and roof.

Standard Brands, Inc., has started construction on additions to its Chase and Sanborn coffee plants in Chicago and San Francisco. The additions will provide more production and storage space. The company is also building a margarine plant in Atlanta, Ga.

Taggart Dried Fruit Co. plant at Hollister, Calif., valued at $150,000 and containing $100,000 worth of dried fruit, was razed by fire in early January. Owned by Robert Taggart, it specialized in drying prunes and apricots, and putting up holiday trade packs.

Personnel

Fred F. Burns, formerly president, Consolidated Flour Mills Co., Wichita, Kans., was elected president, Kansas Milling Co., Wichita, in January, to succeed Ward Magill, president for 18 years. Reginald P. Jackman, Colorado Springs, Colo., was re-elected vice



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president, and Mrs. Terresa Lassen Comley was elected secretary-treasurer and a director.

J. H. Clark, assistant head, purchasing department, Swift & Co., Chicago, succeeds the late L. A. Shepherd, as head of the department. Clark has been with Swift & Co., 32 years.

Harry W. Dusold, formerly master brewer, Billings Brewing Co., Billings, Mont., has been appointed master brewer, Oshkosh Brewing Co., Oshkosh, Wis., succeeding A. Thomas Schwalm, who resigned to become co-publisher of an Oshkosh newspaper. Raymond C. Holahan, formerly master brewer and general manager, Overland Beverage Co., Nampa, Idaho, succeeds Mr. Dusold as master brewer of the Billings Brewing Co.

Charles G. Ferrari, who was in charge of the Chemical Research Division of General Mills, Inc., and later assistant to the vice president in charge of research for Standard Brands, Inc., has joined the J. R. Short Milling Company as Technical Director, according to an announcement by President J. R. Short.

Howard W. Files, vice-president, Pillsbury Mills, Minneapolis, has been nominated for a second term as president of the Millers' National Federation. The nomination will be formally voted upon by the membership in a poll to be conducted during March.

Karl B. Norton has taken over the consulting practice and laboratory of Dr. Donald K. Tressler of Westport, Connecticut. Mr. Norton, who was

EDWARD K. KERWIN was recently promoted vice-president in charge of Distribution for Sunshine Biscuits, Inc., according to company president, Hanford Main. Mr. Kerwin has been with Sunshine since 1926.

FOOD MARKETING

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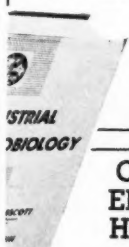
1. 22 leaders of the FOOD industry tell the inside story of successful food marketing, in this new book. They separate this complex industry into its most easily understood working parts, describe them accurately, and show their problems, practices, and relations one with the other. Invaluable for those interested in both the operating and the broader aspects of the present-day miracle of food distribution. **Edited by Paul Sayres, President, Paul Sayres Co., Inc. 340 pages, $5.00**

FLAVOR

2. A handy source of reference information on every aspect of flavor and taste. Includes chemistry of flavoring agents and conditments . . . methods of developing flavors in processed foods . . . methods for the detection, correction, and prevention of undesirable flavor in commercial products. Covers everything from natural sources of taste to beverage appraisal by taste and commercial quality scoring. **By C. E. Crocker, Arthur D. Little, Inc. 172 pages, 33 illus., $3.50**

INDUSTRIAL MICROBIOLOGY

3. New, second edition, packed with methods and data that ensure better investigation and control of fermentation processes. Explains laboratory and plant methods associated with yeasts, bacteria and molds, their cultivation, conditions of fermentation end-products, etc. Presents information on production statistics, media and methods . . . fermentation products . . . processes of saccharification, etc. **By S. Prescott, M.I.T., and C. Dunn, M.I.T. 2nd Ed., 923 pages, 124 illus., $8.50**



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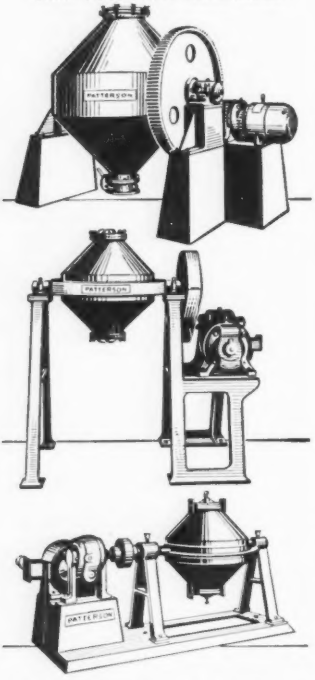

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W. HOWARD CHASE, General Foods' director of public relations, has been loaned to the Office of Defense Mobilization as an assistant to Charles E. Wilson. He will advise the government's top defense agency on information policy.

O. J. KAHLENBERG, former director of research for the National Egg Products Assn., has been appointed director of research and product development of the F. M. Stamper Co., Moberly, Mo., and its canning division, Banquet Canning Co.

associated with Dr. Tressler during the early development of frozen foods, continued in that field for many years with General Foods, and later with Standard Brands.

Associated Industry

Borg-Warner, Chicago, has elected Harold G. Ingersoll a vice-president. He will retain the presidency of the corporation's Ingersoll division, Newcastle, Ind., as well as his place on BW's board of directors.

Caterpillar Tractor Co. has created a fourth sales division, to be known as the Plains division. National territory is now divided among the Western, Central Plains and Eastern Divisions.

Dewey and Almy Chemical Co., Cambridge, Mass., plans a new factory for the manufacture of Cry-O-Rap plastic bags, used for packing various meats, fish and poultry. A site has been selected at Cedar Rapids, Iowa.

James Dole Engineering Co. is the new corporate name for what was formerly Schwarz Engineering Co., Inc., San Francisco.

General Box Co., Chicago, plans a new building in Des Plaines, Ill., to house experimental laboratory and executive offices. A one-story structure, the building will cover 22,300 sq. ft., 9,300 of which will be devoted to the laboratory.

Peters Machinery Co., Chicago, has elected H. Lyle Greene to succeed its late president, H. Kirke Becker. Mr. Greene was formerly president of J. L. Ferguson Co., Joliet, Ill.

Lunkenheimer Co., Cincinnati, has elected Paul M. Arnall, president to succeed Frank P. Rhame, resigned. Mr. Arnall has been with Lunkenheimer since January, 1950, and at the time of his election was first vice-president and general manager. Mr. Rhame will continue as a director of the company and will act in an advisory and consulting capacity.

Deaths

Gerald C. Baker, 56, technical director, Peoria division, Pabst Brewing Co.—Dec. 17.

Bruno A. Bergenthal, 67, former president of the Red Star Yeast and Products Company, Milwaukee, Wis.—Jan. 21.

Gennaro Calabrese, 72, president, Illinois Specialty Bakers' Association, Chicago—Dec. 21.

Walter Geist, 56, president, Allis-Chalmers Mfg. Co., Milwaukee, Wis., since 1942—Jan. 29.

William C. Prater, 85, pioneer figure in the Washington state meat packing industry—Jan. 3.

Warren Wright, 75, former owner and son of founder of Calumet Baking Powder Co., Chicago—Dec. 28.

Books

Food Producers in Various Fields Can Utilize Dairy Byproducts

BYPRODUCTS FROM MILK. *By Earle O. Whittier and Byron H. Webb. Published by Reinhold Publishing Co., 330 W. 42nd St., New York 18, N. Y.*, 1950. 317 *pages; 6¼x9¼ in.; cloth. Price,* $6.

Here is a book that can be of considerable value to operators of small dairies, or other food plants, and to managers and engineers in both large and small plants.

While placing most of the emphasis on dairy byproduct utilization, the authors provide basic information on the chemistry and nutritional values of the components of milk. They also outline the reaction of milk during heating and other processing treatments.

Directions for making such products as fermented milks, whey chesses, condensed and dried whey, bread, ice cream mix, candy, milk sugar and casein enhance the book's value to the small food manufacturer. The portion on bakery products should particularly interest bakers as well as producers of milk products.

The authors have not confined their efforts solely to commercial operations. Procedures are also outlined that are not as yet in practical use but that appear to offer promise of commercial value.

Both authors are serving with the Bureau of Dairy Industry, Agricultural Research Administration, Department of Agriculture. The chapter on bakery products was prepared largely by Lucien V. Rogers, with the aid of Mr. Webb.

B Vitamin Study

THE BIOCHEMISTRY OF B VITAMINS. *By Roger J. Williams, Robert E. Eakin, Ernest Beerstecher, Jr., and William Shive. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y., 1950. 741 pages; 6¼x9¼ in.; cloth. Price, $10.*

Food chemists concerned with enrichment and other aspects of nutrients in foods will find a valuable fund of information in this comprehensive work on the B vitamins.

A section has been contributed by each of the four authors embracing: (A) Characterization, Distribution, Assay and Biogenesis of B Vitamins; (B) The Catalytic Functions of the B Vitamins; (C) The Role of the B Vitamins in Animal and Plant Organisms, and (D) The Comparative Biological Activities of the B Vitamins and Related Compounds.

Government Buying

DIRECTORY OF U. S. GOVERNMENT CONTRACTS AND CONTRACTORS. *Published by U. S. Bid Information, 3603 R Street N. W., Washington 7, D. C.* 75 *pages. Furnished free to regular subscribers to daily service letter of this company; to others there is charge of* $7.50.

This private company has compiled a directory of the government contracting activity, from the beginning of the Korean war to mid-November, outlining the advertising for bids and the negotiated contract awards that individually amount to $25,000 or more. This publication is an excellent means for identifying government procurement offices and becoming acquainted with the sort of contracts placed by each. Also clear from the compilation are the identities of all major contractors who are doing business with the government and who may be in a position to subcontract a portion of their business to smaller interested firms. Also obvious is the usefulness for determining the scope of competitor activity and the price at which competitive business is being taken.

Research Directory

INDUSTRIAL RESEARCH LABORATORIES OF THE UNITED STATES. NINTH EDITION, 1950. *Compiled by Myron J. Rand. Published by National Research Council, Washington, D. C.*, 444 *pages.* $5.

The growth of research as financed by industry has never been better demonstrated than in this new edition of National Research Council's valuable directory. It presents a descriptive list of 2,845 companies that operate such laboratories with an estimated expenditure by industry of nearly a $1,000,000,000 per year. Also included is a brief appendix listing the major research laboratories of the government and another appendix identifying the major "universities and colleges

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A Klenzade field technician will gladly call and help you plan a complete plant and equipment cleaning program.
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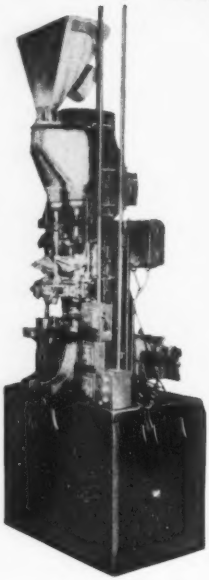

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The material for this directory was gathered during the first half of 1950, and it is particularly noted that "the book contains no unrevised information." Approximately a quarter of the industrial laboratories here reported were not covered in earlier editions.

Freezing Foods

SOME ASPECTS OF FOOD REFRIGERATION AND FREEZING. *Edited by Donald K. Tressler, Published by Food & Agriculture Organization of the United Nations, 1950. 205 pages; 6x9 in.; paper. For sale through International Documents Service, Columbia University Press, 2960 Broadway, New York 27, N. Y. Price, $2.*

Source material for this interesting treatise on frozen foods was taken from papers presented at the FAO meeting in Copenhagen, in October, 1948. The study is comprehensive in its coverage of the freezing branches of the food industry and includes detailed discussions of most of the food items that can be preserved by quick freezing.

Government Publications

TRADE PRACTICE RULES FOR THE COCOA AND CHOCOLATE INDUSTRY. *Federal Trade Commission. Unnumbered leaflet.*

COMMERCIAL ICE-CREAM FORMULAS. *By Allan Leighton. U. S. Department of Agriculture. BDIM-Inf.-11, S1. rev. Oct. 1950.* Formulas are presented for ice cream mixes made from ingredients conventionally used in the ice cream industry. The proportions are those more commonly used. Also provided are formulas for powdered ice cream mixes that meet National military establishment specifications.

These recently issued documents are available at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered from the Bureau responsible for its issue.

COTTONSEED—SUPPLY AREAS. *By John M. Brewster. Production & Marketing Administration. Statistical Bulletin No. 90. Available from Production & Marketing Administration. U. S. Department of Agriculture, Washington 25, D. C.* Gives a basic analysis of the geography of cotton seed as a source of fats and oils. —*End*

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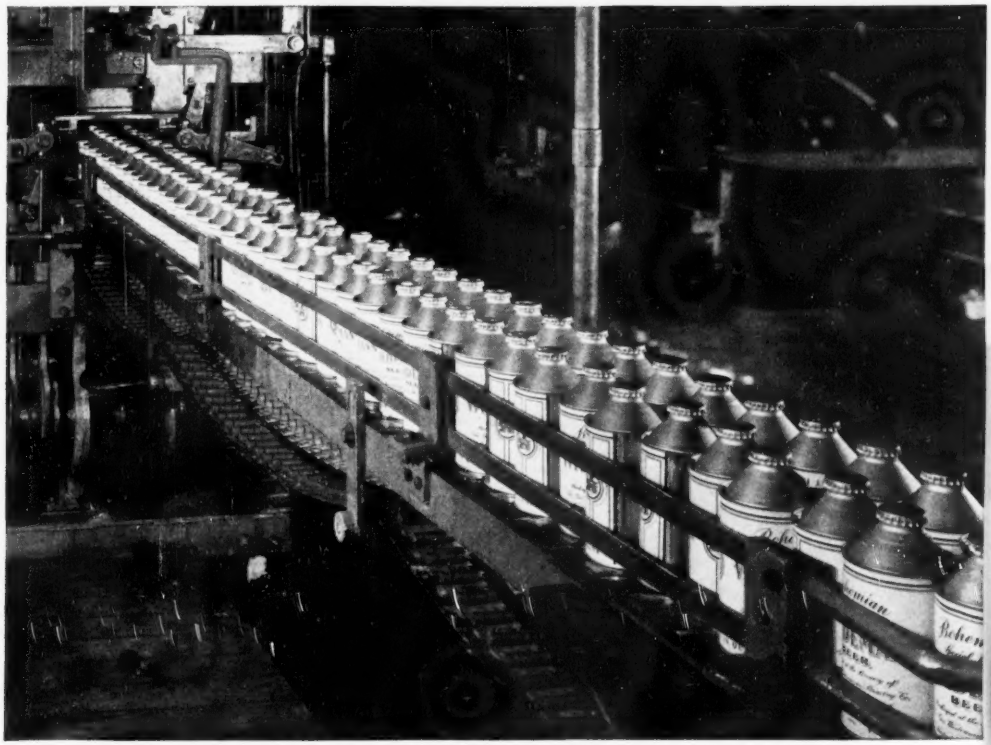

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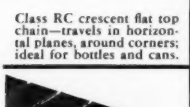
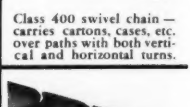
Class 400 swivel chain — carries cartons, cases, etc. over paths with both vertical and horizontal turns.



Class RC flat top chain — precision made for smoothest, spill-free carrying and long life.



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Patents

Mushroom Spawn Substrate Made From Cooked and Swollen Cereal Grains Substantially Free of Adhering Water and Contaminating Organisms—*L. Lescarboura, Oxford, Pa., to Lescarboura Spawn Co., Kelton, Pa. No. 2,520,318. Aug. 29, 1950.*

Unsaturated Higher Fatty Acids and Esters Continuously Hydrogenated With Aid of Continuously Introduced Supply of Highly Active Finely Divided Nickel-Containing Catalyst—*V. Mills, J. H. Sanders, and H. K. Hawley, Cincinnati, Ohio, to Procter & Gamble Co., Ivorydale, Ohio. No. 2,520,422. Aug. 29, 1950.*

Unsaturated Glycerin Oils Containing Polyolefinic Double Bonds Partially Hydrogenated in Continuous Manner From Iodine Values Above 90 to About 60—*V. Mills, J. H. Sanders, and H. K. Hawley, Cincinnati, Ohio, to Procter & Gamble Co., Ivorydale, Ohio. No. 2,520,423. Aug. 29, 1950.*

Unsaturated Liquids Hydrogenated During Passage Through Hydrogenator in Continuous Manner in Contact With Hydrogen and Hydrogenation Catalyst Under Controllable Temperature Conditions—*V. C. Mills, J. H. Sanders, and H. K. Hawley, Concinnati, Ohio, to Procter & Gamble Co., Ivorydale, Ohio. No. 2,520,424. Aug. 29, 1950.*

Unsaturated Fatty Acids and Their Esters Partially Hydrogenated in Continuous Manner to Desired End Point and With Substantially Complete Utilization of Hydrogen Before Acids and Esters Leave Confined Hydrogenation Zone—*V. Mills, Cincinnati, Ohio, to Procter & Gamble Co., Ivorydale, Ohio. No. 2,520,425. Aug. 29, 1950.*

Unsaturated Vegetable Oils Having Iodine Values Between 90 and 140 Hydrogenated in Continuous Process to Iodine Value Below 50—*J. H. Sanders, Cincinnati, Ohio, to Procter & Gamble Co., Ivorydale, Ohio. No. 2,520,440. Aug. 29, 1950.*

Marshmallow-Forming Whipping Material Made to Consist of Syrup, Gelatin, and Glycinin Modified to Have 40 Percent of Nitrogen Content in Form of Water-Soluble Protein Nitrogen—*J. R. Turner, Fort Wayne, and L. Sair, Decatur, Ind., to Soya Derivatives, Inc., Fort Wayne, No. 2,520,581. Aug. 29, 1950.*

Dry-Milled Proteinaceous Flour Made Into Pumpable Aqueous Slurry, Heat-Treated to Inactivate Natural Enzyme Content, and Cooked to Make Textile Sizing Composition of Desired Viscosity—*I. L. Griffin, Charlotte, N. C. No. 2,520,597. Aug. 29, 1950.*

Chocolate Liquor Made in Continuous Progressive Series of Steps Starting With Raw Cocoa Beans—*J. Marco to Marco Co., Inc., Wilmington, Del. No. 2,520,807. Aug. 29, 1950.*

Bread Cubed Similar to Diced Vegetables by Mechanical Means—*C. H. Petskeyes to A. G. Bush and O. F. Rohwedder, Davenport, Iowa. No. 2,520,853. Aug. 29, 1950.*

Citrus Juices Processed for Storage by Dehydrating Under Vacuum to Moisture Content of 2 to 5 Percent by Weight and Hermetically Sealing in Container Free From Moisture Vapor in Presence of, but not in Direct Contact With, Moisture-Absorbing Dessicant to Stabilize Powder Against Chemical Deterioration and Caking at Normal Temperature—*R. H. Cotton, Orlando, Fla., and A. L. Schroeder, Brookline, Mass., to National Research Corp., Boston, Mass. No. 2,520,878. Aug. 29, 1950.*

Vegetable Foodstuffs Containing Moisture and Starch Converted to dry, Readily-Constitutable Product by Cooking, Cooling to at Least 4 deg. C., Initially Reducing Moisture Content by 20 to 55 Percent of Initial Weight While at low Temperature Preliminary to Final Drying Operation—*E. J. Rivoche, Washington, D. C., to Farmers Marketing & Supply Co., Ltd., London, England. No 2,520,891. Aug. 29, 1950.*

Homogenized Whole Milk Frozen to Form Mass of Ice Crystals With Liquid Concentrate in Voids Between Crystals and Crystals Removed to Give Concentrate Containing Substantially All Original Non-Aqueous Constitutents of Whole Milk With Qualities and Flavor Unimpaired by Heat Treatment—*J. F. Kowalewski, Anderson Township, Hamilton County, and G. Sperti, Tusculum Heights, Ohio, to Iinstitutum Divi Thomae Foundation, Cincinnati, Ohio. No. 2,520,939. Sept. 5, 1950.*

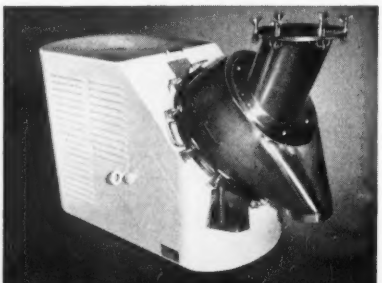
Powdered Shortening Made to Consist of Core of Fat, Hull of Milk Solids Not Fat, and Egg Substance Consisting of Whole Egg and Egg Yolk—*G. C. North, A. J. Alton, and W. C. Brown to Beatrice Creamery Co., Chicago, Ill. No. 2,520,954. Sept. 5, 1950.*

THE NEW RIETZ ANGLE

DISINTEGRATOR

Designed for maximum sanitation . . . even particle size . . . continuous flow. For pulverizing, shredding, pulping, mixing, blending, homogenizing.

Write for Bulletin No. 503.



Rietz MANUFACTURING CO. 441 Folsom Street San Francisco 5, Calif.

Fruit Packaged in Rectangular Container Having Bottom Wall, Side Walls, Web Supports for Fruit, and Ventilation Appertures—*H. D. Pinkstaff, Visalia, Calif., 50 percent to C. Lester, Sanger, Calif., and 50 percent to Paper Products Co., Visalia, Calif. No. 2,521,090. Sept. 5, 1950.*

Sliced Bacon and Like Transferred Into Flexible Bag or Pouch Container by Aid of Paddle Consisting of Perimetric Frame, Attached Handle, and Plurality of Flat Blades Pivotally Mounted to Perimetric Frame—*G. H. Whetzell, Hobart, Ind., to Armour and Company, Chicago, Ill. No. 2,521,196. Sept. 5, 1950.*

Finely Divided, High Melting, Normally Solid Triglyceride Fat Uniformly Suspended in Liquid Fatty Ester to Have Pumpable and Flowable Consistency Throughout Temperature Range of 70-100 deg. F.—*G. W. Holman and O. T. Quimby, Cincinnati, Ohio, to Procter and Gamble Co., Ivorydale, Ohio. No. 2,521,219. Sept. 5, 1950.*

Soya Oil Processed by Solvent Fractionation to Have Improved Odor and Flavor Characteristics and Relatively Non-Reverting Properties—*W. M. Leaders, Houston, Tex., and F. A. Norris, Chicago, Ill., to Swift & Co. No. 2,521,234. Sept. 5, 1950.*

Nut Butter Made to Contain Suspension of Normally Solid Fatty Acid Triglyceride Containing Substantially Homogeneously Dispersed Finely Divided Sodium Chloride, Having Flowable and Pumpable Consistency Through Temperature Range of 70-100 deg. F. and Containing not Substantially More Than 70 Percent by Weight of Total Solids—*P. J. Mitchell, Jr., Griffin, Ga., to Procter and Gamble Co., Cincinnati, Ohio. No. 2,521,243. Sept. 5, 1950.*

Beer Fermented and Ripened by Aid of Float Whose Outer Periphery Covers Periphery of the Fermentate and Inner Periphery Controls Exposed Surface Area of Fermentate—*F. Muller, Elmhurst, N. Y. No. 2,521,397. Sept. 5, 1950.*

Butter Worked Continuously During Passage Through Horizontal Cylindrical Casing Equipped With Helical Ribbon Agitator—*C. E. North, Montclair, N. J. No. 2,521,398. Sept. 5, 1950.*

Wrapped Ice Cream Sandwiches Made by Filling Ice Cream in Plastic State in Space Between Two Edible Wafers Held in Parallel Relation Inside Preformed Wrapper—*L. D. Overland, Brooklyn, N. Y. No. 2,521,403. Sept. 5, 1950.*

Food Dehydrated by Spraying in Liquid State Through High Frequency Electric Field, Spreading in Thin Layer Upon Transparent Carrier, and Subjecting to Radiant Heating—*C. Birdseye to Dehydration, Inc., Gloucester, Mass. No. 2,521,442. Sept. 5, 1950.*

Sliced Bacon Mechanically Folded and Wrapped—*A. C. Gannon to Kingan & Co., Inc., Indianapolis, Ind. No. 2,521,577. Sept. 5, 1950.*

Unfrozen Meat Cut or Ground to ½-inch. Cross Section, Frozen Solid While in Loosely Formed Mass, and Pressed Sufficiently to Bind Meat Particles Together at 0 to 20 deg. F.—*E. W. Hopkins, Hinsdale, L. J. Jendryaszek and H. M. Coleman, Chicago, Ill., to Armour and Company, Chicago. No. 2,521,579. Sept. 5, 1950.*

Fish Dressed in Machine Equipped With two Circular Knives in Spaced Relation to two Coaxial Rotatable Drums to Remove Entrails and Backbone and two Rotatable Skin-Removing Disks Spaced Tangentially to Drums—*Sven Lennart Laurin, Göteborg, Sweden, No. 2,521,640. Sept. 5, 1950.*

Yeast Dried by Combination of Rotating Drying Drum, Dip Trough, Preheater, and Circulating Chamber for Preheated Liquid Material—*A. M. Fischer, Chicago, Ill. No. 2,521,706. Sept. 12, 1950.*

Color of Ground Meat Improved by Applying Edible Protein Denaturing Agent to Surface of Particles, Freezing, and Pressing Frozen Meat Together to Form Mass Containing Oxygen in Interstices—*E. W. Hopkins, Hinsdale, and L. J. Jendryaszek and H. M. Coleman, Chicago, Ill., to Armour and Company, Chicago. No. 2,251,849. Sept. 12, 1950.*

Lactalbumin Recovered From Whey by Adding Coagulable Protein, Adjusting to pH 4-5, Heating Mixture Above Coagulation Point of Proteins, and Draining—*G. Josh, Crown Point, Ind., and M. E. Hull, La Grange, Ill., to Armour and Company, Chicago, No. 2,521,853. Sept. 12, 1950.*

Fatty Materials Stabilized Against Oxidative Rancidity by Inclusion of Antioxidant Containing Monoalkyl Ether of Tertiary Butylated Hydroquinone, Hydroquinone, and Acidic Synergist—*H. R. Kraybill and B. W. Beadle, Chicago, Ill., to A. W. Brickman, V. Conquest, F. J. Madden, W. B. Oleson, and E. T. Filbey, as Trustees, No. 2,521,856. Sept. 12, 1950.*

Packaged Cereals Handled on Conveyor System Equipped With Means to Detect Light- and Over-weight Packages—*G. W. Cheeseman and G. J. Chomis, Akron, Ohio, to Quaker Oats Co., Chicago, Ill. No. 2,521,877. Sept. 12, 1950.*

Egg Whites Separated From Yolks by Automatic Mechanical Means—*J. C. Gill, Indianapolis, Ind. No. 2,521,907. Sept. 12, 1950.*

Piecrusts Mechanically Rolled to Desired Thickness, Trimmed to Desired Diameter and Transferred to Pie Tin by Aid of Thin Flexible Material Interposed Between Crust and Surface on Which It is Rolled and Trimmed—*H. F. Kors, ½ to A. J. Braun, Chicago, Ill. No. 2,521,982. Sept. 12, 1950.*

Edible Portion of Watermelon Shredded, Separated Into Juice and Fibrous Tissue, Resulting Pulp Frozen to Make Individual Serving Confection—*H. A. Priddy, Wichita Falls, Tex. No. 2,521,995. Sept. 12, 1950.*

Fruit and Similar Objects Delivered in Predetermined Quantities for Packaging by Belt Conveyor System Equipped With Lateral Discharge Openings Inside Wall of Frame Closed by Gates Automatically Actuated to Permit Diversion of Travel From Conveyor Belt Through Discharge Opening—*F. Rottier, Lansing, Ill., to Piowaty-Bergart Co., Chicago, Ill. No. 2,521,998. Sept. 12, 1950.*

Coffee Extract Made by Distilling Aqueous Suspension of Ground Roasted Coffee Beans Under Vacuum Below 42 deg. C., Condensing Distillate, and Combining Distillate With 90 to 95 deg. C. Water Extract of Still Residue—*Pierre A. Bacot, Le Mans, France, to Societe Immobiliere & Financiere du Parc, Ivry-sur-Seine, France. No. 2,522,014. Sept. 12, 1950.*

Raw Sugar Juice Purified by Series of Ion Exchange Treatments Prior to Any Chemical Treatment—*W. W. Durant, Old Greenwich, and W. A. Blann, Stamford, Conn., to American Cyanamid Co., New York City. No. 2,522,022. Sept. 12, 1950.*

—*End*

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Now you can do more mixing in less time—with the Worthington-Ransome Rotating-Tilting Pan-Type Mixer.

The drum is not only motor-*rotated* . . . it's also motor-*tilted*. Push-button tilts drum to any angle while rotating—materials discharge *completely*, with no nuisance of scooping.

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Write for Bulletin R-708 on Worthington-Ransome Mixers, built from designs developed from nearly a century of mixer experience.

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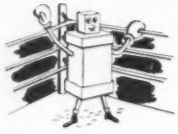

This sturdy lightweight shipping box handles a heavyweight's job!

Nuts and bolts, castings, hardware, metal extrusions, nails, textile yarns and finished goods, and similar heavy and bulky products really give a shipping box a beating. Until this H & D lightweight came along, only "heavyweight" boxes could take such punishment. But with stitched caps on half outer liners that completely eliminate distortion in stacking, this low-cost box takes all the beating a heavy load can hand out. No wonder it cuts packing and freight costs!

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Equipment Catalogs, Bulletins

Instruments for Research Surveyed

A unique compilation of facts and application data about analytical and precision measuring apparatus makes up 84-page cardboard-bound Bulletin 15-14. Particularly interesting is section devoted to analysis, where graphs and diagrams add to details on such equipment as polarographs, spectrometers and gas analyzers. Measurement of vacuum, force, motion also covered. Bulletin emphasizes the remarkable development of continuous-measuring technics in laboratory and pilot plant.—*Brown Instruments Div., Minneapolis-Honeywell Regulator Co., Philadelphia.*

Armour Foundation Progress

Over 300 projects were actively worked upon at the Armour Research Foundation in 1950, and now a handsome 58-page annual report details the comprehensive accomplishments. Research subjects varied from measuring the cleansing efficiency of a scouring agent to developing photographic film for sub-zero work. A review of the activities of this forefront organization is regarded as a "must" for those who keep informed in the process field.—*Illinois Institute of Technology, Chicago.*

Treatise on Roofing, Siding

Here, in 42 well illustrated pages, is comprehensive coverage of the types, properties and uses of asbestos corrugated roofing and siding materials. Ease and flexibility of erection are primary merit of this preformed material, and lucid details and drawings make applications clear. Booklet includes estimation table and information on construction accessories.—*Keasbey & Mattison Co., Ambler, Pa.*

Comprehensive Facts on Retorting

Excellent piping diagrams and a convenient retort capacity nomograph enhance the new 27-page edition of Bulletin 19 on retort installation, equipment and operating procedures. Practical data supports clear recommendations for optimum retort hook-ups and cook sequences. Full details are given on processing both small and large cans under steam or water and with pressure cooling.—*Continental Can Co., Chicago.*

Food Plant Equipment

Mixers, All Uses

Various types of mixers—heavy duty, horizontal, heated and laboratory—are shown with full description in 4-page folder.—*L. O. Koven & Bro., Jersey City, N. J.*

Centrifugal Pumps

Midget centrifugal pumps are close-coupled, for efficiency, with induction motors selected for specific use. Models from ⅛ to ½ hp. are shown with pictures, diagrams and rating charts in 12-page Bulletin 100.—*Eastern Industries, Inc., New Haven.*

Induction Motors

Totally enclosed, non-ventilated squirrel cage induction motors are shown in 4-page Bulletin 1215.—*Fairbanks, Morse Co., Chicago.*

Dairy Pumps, Compressors

Line of dairy pumps, and also compressors is illustrated in 4-page Bulletin WP 1099-B57.—*Worthington Pump & Machinery Corp., Harrison, N. J.*

Ball Bearing Data

Load rating and tables give thrust capacity of ball bearings in newly released catalog. Single and double row angular contact bearings of several types are detailed.—*New Departure Div., General Motors Corp., Bristol, Conn.*

Roller Chain Drives

Handbook covering installation, maintenance and operation of roller chain drives has conversion tables, horsepower rating charts, and prices. Publication is designated catalog ARC-51-PR.—*Atlas Chain Mfg. Co., Philadelphia.*

Universal Joints

Graphs on static torque tests in inch-pounds, angle of operation efficiency curves, and frictional heat loss curves, highlight new 4-page catalog on universal joints. Dimensions, weights and specifications are also given.—*Curtis Universal Joint Co., Springfield, Mass.*

Ion Exchange

Folio of catalog pages gives full information on ion exchange systems ranging in capacity from 30 to 1,000 gph. Photos, diagrams and a performance chart aid in selecting proper unit.—*Penfield Mfg. Co., Meriden, Conn.*

High Capacity Chlorinizer

Visible-flow chlorinizer of high capacity meters gas at ratios from 100 to 6,000 lb. per 24 hr. Described in 4-page Bulletin 840-G27.—*Builders Providence Inc., Providence.*

Humidity Cabinet

New constant temperature and humidity cabinet for laboratory use has capacity of 20 cu. ft. and features wide range control. Earlier models are also described in leaflets designated B6, B7, and B8.—*Food Technology, Inc., Chicago.*

Dust Collector

Details on dust collector using pressed wool felt as a filter medium are given in six page folder. Included is sample of the pressed felt.—*Pulverizing Machinery Co., Summit, N. J.*

Water Softeners

Zeolite type water softeners are delineated in 16-page Bulletin 2386. Units of three basic types are described, and applications are reviewed.—*The Permutit Co., New York City.*

Free Literature—New Quick Way

Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then turn to the Reader Service section inside the back cover, where all items are listed by pages under the heading, "Editorial: New Technical Literature"—each one with a page key number after it. The key numbers also appear on the handy Reader Service postcard. So you circle those for the items desired, sign at the bottom, and mail. No postage needed.

Materials Handling

Tilting, Tiering Fork Truck

New 2,000-lb. Jeep fork truck for tilting and tiering is completely described in 4-page Bulletin 295. It has extreme lift of 130 in., a 59½-in free lift and 83-in. collapsed height.—*Mercury Mfg. Co., 4044 S. Halsted St., Chicago 9.*

Powered Hand Trucks

Two new powered hand trucks, the Electro-Lift and Hydro-Lift, are depicted in 12-page bulletin. Former is battery-powered and motor-driven; later is gas-powered and driven by hydraulic pump and hydraulic motor.—*Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*

Swivel Piler

One page Bulletin 550 details swivel-piler on wheel mount. This simple centrifugal thrower unit is stated to increase storage range considerably. Bulletin 650 describes a swivel piler for conveyor mounting.—*Stephens-Adamson Mfg. Co., Aurora, Ill.*

Electric Tiering Trucks

Telescopic and non-telescopic models of a new straddle-type SpaceMaker electric tiering truck for handling double-faced pallets are specified in 2-page Bulletin 702.—*Lyon-Raymond Corp., Madison St., Greene, N. Y.*

Truck Refrigerating Unit

A packaged truck refrigerating unit, the Carbofreezer, is outlined in 4-page folder. It uses dry ice.—*The Carbofreezer Co., 995 Market St., San Francisco 3.*

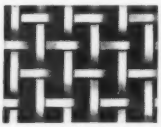
Hand Trucks

Specifications on a complete line of 2-wheel and 4-wheel trucks are provided in 16-page Bulletin 29.—*Lewis-Shepard Products Inc., Watertown, N. Y.*

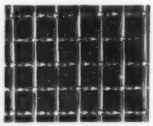
Truck Accessory

Dimensions and capacities of an interchange-

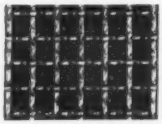
9 REASONS for specifying *Cambridge* Industrial Wire Cloth



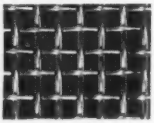
1. Flat Wire Mesh



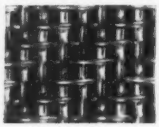
2. Single Intermediate Crimp



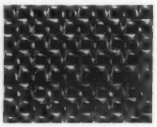
3. Double Intermediate Crimp



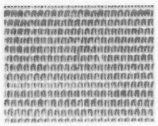
4. Double Crimped



5. Twilled Weave

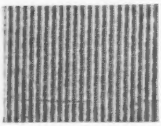


6. Calendered Backing Screen



7. Oblong Mesh

8. Plain Dutch Filter Cloth



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able ram for fork trucks are listed in 2-page leaflet. Ram allows handling of coils, large pipe, paper rolls, etc.—*Towmotor Corp., Cleveland.*

V-Belt Drive

Guide to selection of V-belt drives, including engineering tables and calculations, is provided in 12-page brochure.—*Allis-Chalmers Mfg. Co., Milwaukee 1.*

Vibrating Screens

Medium and heavy-duty service vibrating screens are illustrated, described and tabulated in new 12-page Book 2354.—*Link-Belt Co., Chicago 1.*

Control Equipment

Infra-red Spectrophotometer

A complete explanation of the principle, design, and use of Model IR-2 infra-red spectrophotometer is presented in 16-page Bulletin 153-D. Included are five pages of performance curves.—*Beckman Instruments, Inc., S. Pasadena, Calif.*

Kinetic Manometer

A kinetic manometer based on the variable-area metering principle is fully detailed in 12-page Catalog 42. Unit is stated to combine advantages of area meter and orifice meter, eliminating some disadvantages of each.—*Fischer & Porter Co., Hatboro, Pa.*

Pyrometer Equipment

New pyrometer equipment featuring accuracy to ¾ of 1 percent is delineated in 8-page Bulletin GEA-5534. Unit is for indication and control of temperature and protection of heat-process equipment.—*General Electric Co., Schenectady, N. Y.*

Plant Supplies

Vanilla Extract, Blend Evaluated

Comparative evaluation of flavoring quality and durability of pure vanilla, vanillin-coumarin solution, and imitation vanilla flavor are graphed and tabulated in 19-page organoleptic profile report.—*The Aromanilla Co., Inc., New York City.*

Line of Gaskets

Spiral wound gaskets and complete line of metal, metal asbestos and cut gaskets are covered, along with descriptive material on Teflon and its industrial use, in well illustrated, 48-page publication—*United States Gasket Co., Camden, N. J.*

Flexible Plastic Pipe

Properties and uses of flexible plastic pipe are described in 8-page illustrated catalog.—*Johnson Plastic Corp., Chagrin Falls, Ohio.*

Wool Insulation Data

Many engineering details, including fine construction drawings, comprise 12-page manual on the use of wool insulation in cold storage structures.—*Pacific Lumber Co., San Francisco.*

New Spice Flavorings

Spisoresins are special extractions of dry spices for use by manufacturers of dry or liquid seasonings. How they are used and made, and a listing of all compounds, are presented in 8-page booklet.—*Dodge & Olcott, Inc., 180 Varick St., New York 14.*

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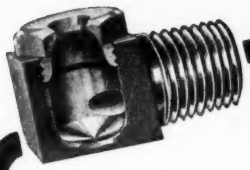

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Powder Milk
Dry Eggs
Wash Filter Cake
Humidify
Banana Rooms

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if the liquid can be sprayed with direct pressure Monarch can furnish the Nozzles.

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Expendable Pallets

A general description of Power-Pack expendable pallets (made of corrugated fibreboard), profusely illustrated with in-plant pictures, is contained in 16-page brochure.—*Addison-Semmes Corp., 1800 Thurston Ave., Racine, Wis.*

Mechanical Packings

Featuring a simplified recommendation chart, 32-page catalog graphically illustrates and describes line of mechanical packings. Included is the popular process packing that is self-forming, -lubricating and -sealing.—*Packaging Div., Flexrock Co., Filbert & Cuthbert Sts., Philadelphia 4.*

New Floor Cement

Corrosion-resisting flooring is offered in a new "calcium-aluminate" material that can be applied like conventional cement. Leaflet of 4-pages depicts applications and reports advantages of product.—*Warren Refining & Chemical Co., Cleveland.*

Welding Electrodes

Complete technical information on every type of bronze welding electrode that company manufacturers is offered in 24-page Bulletin W-17. Selection of electrode and its preheating temperatures are simplified by charts.—*Ampco Metal, Inc., Milwaukee 46.*

Dry Chemical Fire Protection

Four-page folder tells how new dry chemical fire protection system operates.—*Ansul Chemical Co., Marinette, Wis.*

Miscellaneous

Figuring V-Belt Drives

Twelve-page booklet contains sample calculations and all necessary tables and diagrams for figuring correct size of V-belt drives. Line of drives is also pictured and specified.—*Allis-Chalmers Mfg. Co., Milwaukee.*

Maintenance Check Chart

Many common building maintenance problems and a recommended solution for each are tabulated in 6-page folder. Over 100 products and processes for floors, roofs, interior and exterior walls, waterproofing and paints are listed.—*United Laboratories, Inc., 16801 Euclid Ave., Cleveland 12.*

Complete Vitamin Listing

Uses and descriptions of every known vitamin are presented in 16-page booklet and accompanying scientific comments on mimeographed sheets. Many modern concepts are included.—*Wm. T. Thompson Co., 2727 Hyperion Ave., Los Angeles 27.*

Guide for Multiwall Paper Bags

Multiwall Packaging Guide, 20 pages, describes and illustrates the best ways to use multiwall paper bags. Dealt with are storage of empty bags, filling, closing, handling of filled bags, and palletizing.—*Bemis Bro. Bag Co., 408 Pine St., St. Louis 2.*

Stainless Steel Facts

Analysis, corrosion resistance and working characteristics of Carpenter stainless 20 steel are set forth in 18-page booklet. This is the metal that is not affected by hot solutions of sulphuric acid.—*The Carpenter Steel Co., Reading, Pa.*

Storage and Transportation

Shipping and holding facilities on a large scale, offered along with special services, including repacking, weighing and clerical detail, are described in 24-page brochure.—*Leheigh Warehouse Transportation Co., Newark, N. J.*

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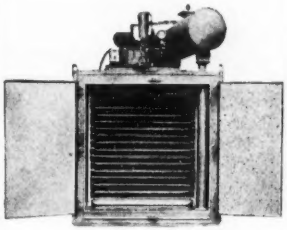

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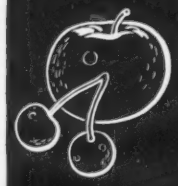

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HEADQUARTERS FOR BUSINESS INFORMATION

McGRAW-HILL publications

Preventive Quality Control

—Continued from page 79

operating properly and that the time factor is in accordance with specifications.

Other Functions Performed

The brief outline presented in this article indicates how a preventive quality control system can be set up and operated. And reference has been made to some of our own procedures and products in order to illustrate the technic. No mention has been made of clean-up procedures, or sanitation, or good housekeeping, all of which are essential features of any quality control system. Here, so much information is available that there does not seem to be anything to add.

We do pay careful attention to the clean-up procedures for our equipment. These are regulated by standard instructions for all departments, issued jointly by laboratory and sanitation departments. We also make regular physical inspections to be sure these instructions are carried out. Regular bacteriological tests are carried out on various lines to check clean-up procedures (and operating efficiency), as well as variations in materials and ingredients and processes.

Cooperates With Engineering and Purchasing

The quality control department also works closely with the engineering department and production staff in the selection of materials to be used in the construction of equipment which comes into contact with the product, and in the selection of new processing or packaging equipment.

Close cooperation with the purchasing department is of course essential. It is difficult, due to the natural variation in such materials as fresh or frozen fruits and vegetables or meat products, to set up purchase specifications for these items. We do try to specify minimum quality requirements whenever experience indicates this is necessary and desirable. However, we have found it most helpful in control to purchase from a reliable supplier who maintains a quality control system of his own. Experience has shown that all we need is a few visual and organoleptic tests to satisfy ourselves that deliveries are up to standard.

Examination of samples of materials from our new suppliers, or of alternate ingredients and materials for our various products, is an important phase of the laboratory division of quality control. It requires experience as well as knowledge of the product and manufacturing procedure to evaluate these materials. As a safeguard, pilot scale batches are made from any important new material before it is adopted as a standard ingredient.

Consults On Unusual Happenings

There is also a lot of laboratory work "behind the scenes" which, although not functioning in day to day control, is essential in the development of standards and in the setting up of operating procedures and processes. The laboratory staff is always available for consultation when any unusual event occurs during manufacturing or processing.

The quality control staff, in the final analysis, is held responsible for the quality of the finished product. But, as indicated above, the real control depends primarily on the alertness, common sense, and interest of the supervisors and operators in all departments.

An important function of our quality control system is to develop ways and means of obtaining, and retaining, the enthusiasm and cooperation of all concerned in maintaining the desired quality in each individual package bearing the Crosse & Blackwell name.

End (*Resume reading on page 80*)

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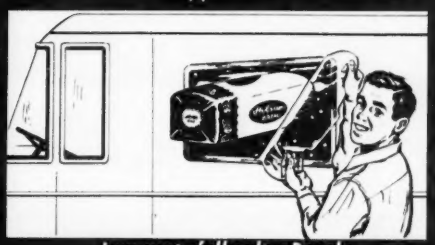

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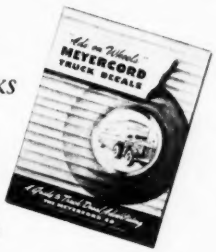

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CONVERT YOUR TRUCKS TO "ADS-ON-WHEELS"

How to Vitamize Candies

—*Continued from page* 106

form and can be purchased by the kilo or multiples thereof when necessary.

Pre-Mix for Chocolate Bars

On the assumption (1) that the daily requirements for each of the vitamins will be incorporated into the unit weight of 1 oz. of finished candy, (2) that the standardization of the vitamin A and D solution will contain 200,000 units of A and 20,000 units of D per gram, and (3) that the other vitamins will be purchased in pure form, the following procedure will be found applicable but can be varied at the discretion of the operator:

For each pound of pre-mix, weigh 38g. of the concentrated vitamin A and D solution (as purchased from the supplier), 1.84g. of vitamin B_1, 3.68g. of vitamin B_2, 18.4 of niacin, and 55.2g. of ascorbic acid. Next, add these vitamins to sufficient molten chocolate (120 deg. F.) to bring the total weight up to 1 lb. Now mix thoroughly.

Blending can be done in a Hobart mixer, and as many pounds of pre-mix can be prepared as may be indicated. During preparation of the pre-mix, the stirrers should be kept in constant motion for ½-hr. Then the mass should be run off into suitable molds for solidification.

While the directions call for all six vitamins, fewer may be used if desired, the process directions being the same for any number of vitamins.

Each pound of pre-mix will vitaminize 100 lb. of chocolate and provide a margin of safety for shelf-life deterioration of 20 percent for vitamins A and D and 15 percent for the other vitamins. It may be necessary to increase the reserve for vitamin C, but that would have to be determined by testing. To vitaminize a bulk of chocolate for molding purposes, it would only be necessary to weigh 1 lb. of the pre-mix, prepared as described, and to add it to 99 lb. of chocolate.

After proper blending and mixing, each ounce of finished chocolate would contain the required amount of vitamins to the predetermined standard. Stirring is continuous while the vitamins in the pre-mix are being blended, and it is continued until the enriched finished chocolate is run off into molds. Subsequent treatment is the same as for any run of molded chocolate.

Enriching Fudge

This step is almost as simple as enriching molded chocolate goods, especially where the flavoring is preponderately chocolate. In this case, the vitamin concentrate or pre-mix is made up in a base of chocolate liquor. Other flavoring materials, such as vanilla, can be added in sufficient quantity at the same time, so that 1 lb. of the premix or any other weight of chocolate liquor that the formula calls for can contain both the vitamins and the flavoring materials to take care of a given weight of confection.

The pre-mix is added when cooking is completed. Heat is shut off and the temperature is kept as low as possible, consistent with subsequent procedures. It must be emphasized, however, that the finished weight of the batch must be known. In other words, if a finished batch weighs 180 lb., then enough vitamin and flavor pre-mix must be added to enrich that weight of candy. If there should be a weight discrepancy of, say, 5 lb., and it has not been taken into consideration by the addition of vitamins, then the whole batch will be lower in vitamin value than planned. In turn, this means that the safety margin originally set has been lowered.

When vanilla and other non-chocolate flavored fudges are made, then the base of the pre-mix must be changed.

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Where fondant is used in making fudge, it can be employed for the pre-mix. The vitamins and flavors are added to a known weight of fondant after it has been remelted. Thorough mixing is again required, after which the pre-mix can be placed on one side until needed, or a definite weight of the liquefied-fondant-vitamin premix can be added to a known pre-determined weight of finished batch. Here, again, the fondant is added to the batch after cooking has been completed and the heat is shut off.

The higher moisture content of the fondant may call for a slightly higher cook in the rest of the batch—that is, for compensatory purposes, so that the finished confection does not end with a higher moisture content than is customary for that type of candy. Needless to say, the fondant-premix must be thoroughly blended after it has been added to the material in the kettle. The rest of the processing follows conventional lines.

Vitamin-enriched caramels can be made in the same way as chocolate fudge, as far as processing and preparing vitamin pre-mix is concerned. The rest of the precautions and directions are then followed—with addition of the pre-mix at the conclusion of the cooking and at the lowest possible temperature.

In non-chocolate caramels, the vitamin pre-mix can be made on a base of pulverized dextrose as a dry mix, instead of as a chocolate liquor, as used hitherto. A weighed amount of the dry mix is added to the rest of the batch, as outlined in the earlier procedures for making fudge. The weight of dextrose added as pre-mix can be allowed for, if necessary, by adjusting the weight of dextrose in the formula, if it is added as such. Otherwise, a slight adjustment of corn syrup weight may be indicated.

Vitaminizing of jelly candies, marshmallows, nougats, and fruit-flavored hard candies will be considered by the author in the concluding Part II of this article to appear in an early issue. And included will be details on testing and checking, information on sources of pure vitamins, and tips on labeling. End *(Resume reading on page 107)*

Wet Corn Mill House

—Continued from page 124

nozzles in the periphery of the bowl, and a portion of it is recirculated to produce the desired concentration to give good separation.

At Staley's, a two-pass system is employed. First pass centrifuges are adjusted to produce high-protein gluten in the overflow and an impure starch fraction from the underflow. This starch is diluted and fed into the second pass, which produces a pure starch that is sent to the starch drying building. Low-protein gluten is recovered in the second pass and recirculated back to the first pass, moving through a centrifugal clarifier to concentrate it. Ten B-30 Merco's are used for the first pass, while 4 B-30's and 9 B-16's are used for the second pass. The B-30's are powered by 100-hp. motors; B-16's by 25-hp. units.

Advantages of Centrifuging

Engineers at Staley's are of the opinion that separation by centrifuging offers the following advantages: Starch yield is considerably greater; starch product is of higher quality; sanitation is improved because the unit is completely enclosed and retention time in the machine is very short; counter-current routing of process water reduces liquid input; installation requires a relatively small amount of floor space; and operational and maintenance expenses are low.

Another important engineering advance at this plant is electrical inter-

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locking of power units driving processing equipment in a particular flow line. If one piece of equipment—say a shaker—breaks down, all the units bringing material to this unit will be automatically shut off. Thus, only the unit that breaks down initially will have to be repaired. And waste of material is cut to a minimum.

Still another progressive measure is the way feed is handled in the packing house. Storage bins are continually circulated to mix feed and prevent stratification. The feed is held in the bins for 3-4 hr. During this time, moisture and protein analyses are run. The feed is then packed, with additional protein and moisture being added as necessary to bring the gluten feed to control specifications.

End (Resume reading on page 125)

Warehouse Twists

—Continued from page 99

or more through and under the pallets.

Duct openings are round and of the scoop type. Adjustable louvers in the outlet stratify air delivered, and the outlets themselves can be turned through a complete circle to permit air direction as desired.

Plant refrigeration is supplied by five 6 cylinder "V" type Vilter compressors, two being driven by 50 hp. motors at 600 rpm., the others by 75 hp. motors at 900 rpm. The smaller compressors are arranged for automatic control and equipped with unloaders, making it possible to operate at ⅓ or ⅔ of one 50-hp. compressor capacity in the winter.

Horizontal shell and tube condensers are used, since the Wenatchee River affords an unlimited supply of water for the mere cost of pumping.

Refrigeration in the cold storage rooms consists of specially built-up units arranged in the truss spaces. Care was taken in locating them to avoid drip or spillage on stored fruit below. Since both ductwork and refrigeration units are located in the truss area, sufficient floor-space is saved to accommodate several thousand boxes of fruit.

Automatic defrosting of the eight refrigeration units is handled from the engine room. Water, warmed to 65 deg. F., is sprayed over two units in each room simultaneously. Spray is of 8 min. duration, with a 3 min. drip period following. When defrost cycle ends, room units are again cut into the system. Drain lines from the drip pans are large and pitched to the engine room sewer connection.

An interesting addition to the engine room equipment is a central-reading temperature station. Each of the four cold storage rooms has temperature sensitive bulbs that connect electrically to an indicating instrument on the engine room panel. This makes it possible to check temperature at any time without entering the cold storage rooms.

The packing building accommodates two washers of 600-box-per-hour capacity. Boxes are dumped automatically and fruit flows through the machines to sorters and packers.

Novel Heating

The packing area is heated by a small automatic boiler that serves wrought iron coils in the floor slab. This novel method utilizes automatic controls, and thus makes it possible for sorters and packers to be comfortable in the winter. This avoided special housing of the area away from the operating space, thus saving on fruit handling.

The segretation area is arranged to separate the sizes, grades and varieties (about 45 in number) and permit their distribution onto pallets designed for cold storage. Arriving at the car-loading dock, fruit from the packing building may go directly into cars or to any one of the belt conveyors for classified storage.

Dual function of the segregation area is (1) temporary storage of fruit to be packed and (2) use as a common storage building. When weather conditions create a situation where fruit must be handled in a rush, this space in the segregation building is of great value in handling the overflow.

The ideal location selected for this plant includes ground to double the cold storage capacity, if desirable. The present storage area, accommodating 525 carloads, offers great convenience. Trucks can approach from three sides, while a railway track comes in on the north.

End (Resume reading on page 100)

Kraft Zones Distribution

—Continued from page 90

ble and may be applied to any size truck body that has full-opening rear doors. Also they stress that there may be great flexibility in the size of pallets used. For instance a transport truck might carry such an installation for handling loads that are a single pallet wide.

Kraft is licensing the mechanical truck installation, and detailed plans are furnished showing how the company puts the method into operation. With adaptation, the system can be made to fit into many kinds of distribution businesses.

In summarizing the benefits of the new system officials point out that, over the years, the company's distribution costs had been brought as low or lower than similar operations. Thus, the new savings of 25 percent in delivery costs represent a further refinement of an already efficient and economical system.

End (Resume reading on page 91)

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WANTED: SALES Engineer. Immediate opening for qualified sales engineer to head sales promotion work in food and allied industries, at home office of leading manufacturer of industrial instruments, located in New England. Occasional traveling. Graduate engineer preferred. Permanent position. Salary. A good company to work for. Congenial, cooperative associates. Send full particulars. P-8534, Food Industries.

HELP WANTED: Experienced middle-aged man to work in the State of Conn. One who knows how to make Ice Cream and Ice Cream Mix, must also have experience in running Continuous Freezer. Steady position to the right party. State experience, salary desired and references. Apply immediately to P-8747, Food Industries.

GENERAL MANAGER. We need a hard-hitting, high-type executive for a large Mid-West packing plant. Unlimited opportunity for aggressive, experienced man. State full experience in first letter. P-8797, Food Industries.

GENERAL SALES MANAGER—For nationally-advertised dairy specialty product. To live in large mid-western city. To supervise established sales offices and their personnel, handling general sales problems in the contacting of dairy and retail grocery operations. Constant traveling. Age 35-45. Salary $15,000 per year to start, or commensurate with past experience and ability. State fully background experience, references, marital status, photo if possible, etc., in first letter. All replies will be held strictly confidential. P-8616, Food Industries.

PACKAGING EXPERT. If you know packaging, product control, and quality control, here is a great opportunity with established business! Must be fully experienced in all phases of packaging. Excellent working conditions and salary. P-8798, Food Industries.

FOOD MERCHANDISE Manager. To manage large food mart in Middle West. Expansion program now underway, offering a great opportunity to man experienced thoroughly in merchandising, advertising, sales promotion, and store layout. If you qualify, answer at once! P-8799, Food Industries.

CHEMICAL ENGINEER: Large national firm in cereal field needs graduate chemical engineer with experience in food processing. Location in Minneapolis. Please state education and experience fully. P-9029, Food Industries.

FOOD MIX Technologist: National food firm needs an experienced food mix technician to work on consumer mix research. Please state education, experience and qualifications fully. P-9065, Food Industries.

EMPLOYMENT SERVICE

SALARIED PERSONNEL $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

REGISTERED ENGINEER M.E. 25 years experience in plant engineering, preventive maintenance, power plant and production machinery cost reductions, operation, installations, refrigeration, air-conditioning, machine shop, design and lay out. PW-8974, Food Industries.

POSITIONS WANTED

CHEMICAL ENGINEER, 25. Married with 2 years quality control experience with food processor desires permanent position with food packer. PW-8992, Food Industries.

SANITARIAN. OVER five years experience with large bakery; six years with N.Y.C. Health Dep't. Degrees in chemistry and pharmacy. Any type food plant. Has wide knowledge food production. PW-9006, Food Industries.

FOOD TECHNOLOGIST, technical and administrative background, wants position in production or related. 13 years varied experience in product development, quality control, production, etc., on items such as canned goods, specialties, spreads and jellies. Available reasonable notice. PW-9019, Food Industries.

TWENTY YEARS with Coca-Cola experience in sales, advertising, administration, seek employment with first class manufacturer in sales or executive position. PW-9026, Food Industries.

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POSITION WANTED. Specialist for food products, etc., canning patties, meat and chicken. To organize immediately for Army Supply, private and also Gov't. PW-9066, Food Industries.

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(Continued on page 215)

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Frequently, when there are many applicants for a position, only the most promising letters are acknowledged. The other applicants never know whether their letters reached a prospective employer or not. These men often become discouraged, will not respond to future advertisements and even question their bona fide character.

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Burt Automatic Wraparound Labeler.

S. & S. G1, G4, HG88 Auger Fillers.

Triangle Package Models, G2C, G2S, A2C, N2CA and A6CA Electri-Pak Fillers.

Triangle SHA Auto. Net Weigher, High Speed adj. Semi-Auto Carton Sealer.

Horix and Elgin S.S. Rotary Filler.

Filler 1, 2, 4 and 8 head Stainless Steel Automatic Piston Fillers, Rising Bed feature and Automatic Feed.

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Stokes 2C and Colton Cream Fillers.

Stokes 90D Auto. Tube Filler and Closer.

Amsco, Doughboy and Heat Seal-It 15D "Pacer" Auto. Cellophane Bag Sealers.

Ceco Auto. Carton Closing Machine.

Standard Knapp No. 429 Carton Sealer.

Hayssen 3-7, Package Machinery Co. Model FA, DF; Miller & Scandia SFC and SSU1 Automatic Cellophane Wrappers.

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Pneumatic high-speed Carton Feeder, Bottom and Top Sealer.

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Union STANDARD EQUIPMENT CO.
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TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT

POSITIONS WANTED

(Continued from page 214)

PLANT MANAGER, 24 years experience in Plant Lay-out, Purchasing, Manufacturing, Costs, Quality Control, Supervision of Jams, Jellies, Mayonnaise, Syrups, Fountain and Baker's Supplies, Sauces, Extracts, Canned Fruits, Vegetables, Meats, Chicken, Soups and other Specialties. Age 44, Married. Prefer West Coast. PW-8918, Food Industries.

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We have the plant, equipment, labor force, engineering and management know-how, and a national sales force. Our present products are sold nationally—and are the leaders in their field.

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MEN OR WOMEN
VETERANS OR NON-VETERANS
DAY AND NIGHT CLASSES

Highly qualified instructors with practical experience as well as European and American degrees in their respective fields.

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12—Day, Robinson Powder Mixers, 200 to 5000#.
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8—Pfaudler 8,000-gal. Sectional Glass-lined Tanks.

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Telephone: Cypress 2-5703

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1—Niagara Stainless Steel Filter, 146 sq. ft.
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1—#12 Sweetland Filter, 4" centers, iron or copper leaves.

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